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CONTENTS

ORIGINAL PAPERS

Prescribing for Multiple Visual Needs.
Alton K. Marsters 503

The Prognosis in Strabismus.
Merton C. Flom 509

An Evaluation of the Children's Visual Achievement Forms at Grade I.
Helen M. Robinson, Mildred C. Letton, Lucile Mozzi and Alfred A. Rosenbloom 515

Near Point Diagnosis and Visual Training with the Prism Reader.
Harold A. Solan 526

Visual Problems in Reading and Optometric Limits.
Lois B. Bing 536

EDITORIAL

Multiple Spectacles—An Essential Practice Factor.
Carel C. Koch 542

SPECIAL REPORT

The Changing Concept in Ophthalmic Styling and Dispensing.
Marshall S. Olson and Rudolph Ehrenberg 545

TRANSACTIONS OF THE ACADEMY

Announcement of Program. Annual Meeting, American Academy of Optometry, Boston, December 13, 14, 15, 16, 1958, at the Statler Hilton Hotel.
Ralph E. Wick 554

CURRENT COMMENTS

Your Patients and Multiple Spectacles.
Terry Judith Parkins 557-558

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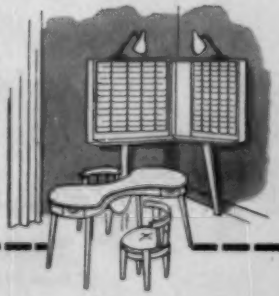

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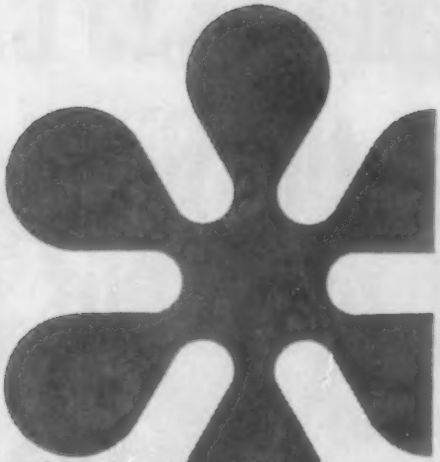

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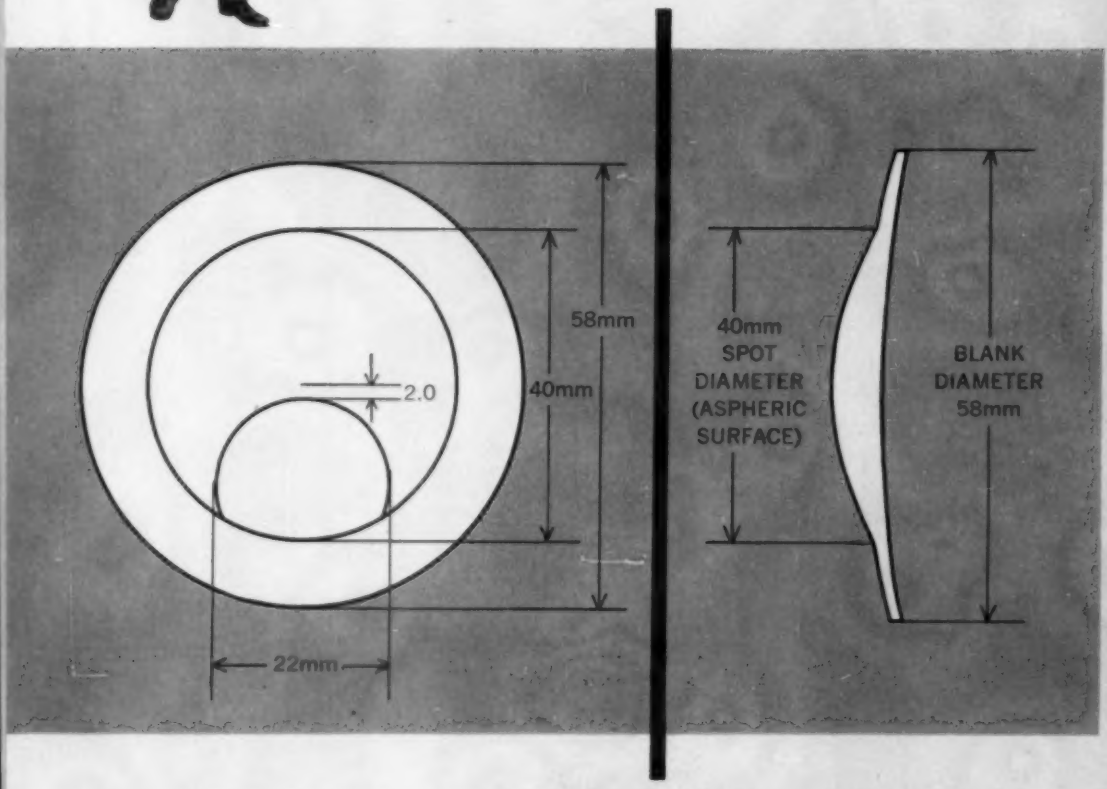

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PRESCRIBING FOR MULTIPLE VISUAL NEEDS*

Alton K. Marsters†
Bausch & Lomb Optical Company
Rochester, New York

This paper is addressed to those optometrists who are willing to work a little harder to achieve a greater degree of success. We are going to review ideas and plans that will help to make the "Multiple Pair Concept" a more effective part of the optometrist's daily routine.

Concerning this subject, there seems to be almost complete agreement on the part of the professions and the industry. For years, articles have been appearing in magazines and newspapers, based on the idea that "One pair of spectacles is not enough." There has been extensive use of the theme, "There is no such thing as an all-purpose pair of spectacles." More recently, we have been hearing about "the right eyewear at the right time." Whatever the words, the ideas are the same. We all agree that many patients need more than one pair of spectacles, but what more can be done about it? This paper offers an answer to this question.

A FUNDAMENTALLY SOUND CONCEPT

Years ago, the optical industry got off on the wrong foot in the promotion of this philosophy. There was much writing and talking about "selling an extra pair." This phrase was bad on two important counts. We know that the optometrist's job is not to sell spectacles but to serve the visual needs of his patients. The word, "extra," is all wrong, since it means "over and above what is required."

The only sound professional approach can be in terms of benefits to the patient. When the optometrist prescribes for multiple visual needs, he does so wholly with the patient's visual comfort in mind. The patient has come seeking better vision and he should be acquainted with all of the ways in which his vision can be most comfortably served.

Many optometrists consider this a fundamental responsibility in their relationships with patients. "This is a matter which is not optional or discretionary on my part," they say. "My obligation is not dis-

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†Vice-President.

charged until I have acquainted the patient with all of the ways in which his vision can be made more effective and more enjoyable."

FACTS ABOUT OPHTHALMIC ECONOMICS

To a greater degree than many of us realize, the recommendation of more than one pair of spectacles to a patient is standard operating procedure in a great many offices, but not in others. The potential is dramatically emphasized in a survey completed a few months ago for the Optical Manufacturers Association. Here are some of the facts.

This survey shows that the American public is currently spending $17 billion dollars a year for liquor and tobacco and only $10 billion for all health services. We pay out each year more for automobiles, more for recreation, than we do for medical, dental, and ophthalmic services combined.

This same survey reveals that there are 77 million persons over age 6 who wear spectacles; 66 million who do not. Of the non-wearers, the survey indicates that there are 21 million, or almost a third, who need spectacles; that, the majority of these, 17 million would wear them if they were aware of their need.

This survey also shows that there are 24 million people—about one-third of all spectacle wearers who own more than one pair. Approximately half of these or 52% have kept their old spectacles as a spare; the other 48% have acquired additional eyewear as insurance against breakage, because of style considerations, or for special visual needs. Thus, only one person in six who wears spectacles has more than one current pair.

The greatest potential of all (and incidentally, the largest present source of multiple pair procurement) lies in the field of prescription sun glasses. Of the 77 million spectacle wearers there are 41 million who are trying to get by with fit-overs or plano sun glasses. Only 7 million have outdoor eyewear made up to their prescription. This means that there are many Americans today crossing streets and driving cars who need and do not have prescription eyewear with glare-absorptive lenses. To be sure, outdoor prescriptions are being written in ever-increasing volume. There is growing recognition of the fact that glare is a matter of brightness, not of temperature. The time to talk prescription sun glasses is when the patient is being fitted—whether July or January. Only in that way can we indoctrinate all patients on this need.

The American public has been provided with the best vision of any nation on the face of the earth. But their vision can be made much better—and it is within our power to make it so.

HISTORY OF AN IDEA

No one knows who was the first advocate of more than one pair of spectacles. One thing is certain—this is not a new idea. Old timers will recall a program of 35 years ago which talked about "style in glasses." A few years later, the Better Vision Institute published a little book entitled "Occupational Analysis." There, in essence, was the foundation for today's program—fashion and function.

More then ever before, fashion is an important consideration, particularly with women. We know that many women regard eyewear as a fashion accessory; they are intrigued by exciting new styles, colors, and trims; they are quick to recognize that the spectacles worn for gardening are hardly the style for an evening affair or an afternoon of bridge. Even men, traditionally not so styleminded, accept the principle that different styles are appropriate for different occasions.

Today, we accept as even more fundamental the functional possibilities and limitations of different lenses for different needs. We have already mentioned the need for outdoor corrections made to the patient's prescription. With more people living to an older age, we pay particular attention to the presbyopic group, suggesting double seg bifocals for those who work above eye level; special focus segs for special distance requirements; trifocals in an increasing number. We know that an additional pair of spectacles with hardened lenses will interest the active sports participant, the hobbyist, or people engaged in occupations where flying fragments may endanger their eyesight.

These facts all optometrists accept without question. Why, then, has there been such a desultory application of the principle for the past three decades? Why is it that, even today, some practitioners approach the problem with diffidence and hesitation? The answer may be the human equation. Each optometrist will follow that course which he finds easiest, most natural, most comfortable. All of us resist change. Man by his very nature is a victim of inertia: he resists a course of action which requires a greater degree of effort.

Also, there are some who say that, no matter how the idea is expressed, it sounds like selling. To many professional minds selling is abhorrent. We sometimes forget that professional people, too, are constantly selling. The lawyer and the dentist sell their services; the teacher sells education; the clergyman sells salvation. In the final analysis, selling ideas can be much more important than selling things.

A JOB OF EDUCATION

The job to be done can be defined more precisely as an educational task. When it is so recognized, our procedure seems to be easy, logical,

natural. To inform the public concerning the opportunities for better vision, to explain to patients the pleasure in more than one pair of spectacles—these are normal activities for the professional man.

With an adequate educational program, many practitioners have discovered an amazing by-product in terms of public relations. They learn that patients want to talk; to discuss what was wrong with their vision and how it may be corrected; to exhibit their knowledge of physical and optical laws which intimately concern them. If patients are to be knowledgeable, it is only because the practitioners make them so.

There are many channels of education other than those to be found in the schoolroom. Whatever the channel, however, it will be found that we are dealing primarily with the communcation of ideas. This may take place in a conversation with a patient; in casual talks with friends, relatives, and acquaintances; in the conversation of wives or receptionists with the people they know; in a talk before a luncheon club.

Nor should we pass by the opportunity of teaching by example. We know one optometrist who does not hide the fact that he has special corrections for golf and for bridge; who, without much prodding, will tell about his hardened lenses and his special shaving spectacles. His wife is always glad to show her friends her make-up spectacles, and her friends are always quick to notice how well her frames match her frocks.

This job of education is not something which can be quickly discharged this week or next. It is a time-consuming process which can be expected to take months and years, but it is something which can pay off at the local level in proportion to the time and effort one puts into it.

WHAT IS AVAILABLE TODAY

Fortunately, it is not necessary for optometrists to face the educational task with empty hands. There are many useful tools available—tools that will speed up and stimulate the process of education. These tools are offered by many different organizations and groups. They are evidence of a united front in solving the problems of multiple visual needs.

One such tool may be found in articles appearing in ophthalmic publications. This month the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY is joining forces with several other ophthalmic publications in special issues stressing "The right eyewear at the right time." It would be worth while to read everything one can on this timely topic.

Many ophthalmic organizations have been working along parallel

lines. The Better Vision Institute has published much material on this subject. The Publicity Committee of the Optical Manufacturers Association has devoted countless hours to enlisting the cooperation of manufacturers. Members of the Wholesale Associations and the American Optometric Association have been active in varying degrees.

Special mention should be made of the monumental book by Clark Holmes, "Guide to Occupational and Other Visual Needs." The first edition of 5,000 copies quickly sold out at $15.00 each. A reprint is now available. This book can prove extremely valuable in documenting with words and pictures specific needs of various vocations and avocations.

Excellent educational tools are available from the different manufacturers; multiple pair cases for patients for holding more than one pair of spectacles; presentation cases to spotlight different styles for different occasions; forms for analyzing visual needs; helpful papers, telling how to develop a multiple pair program; slide lectures for use with Parent-Teachers associations, luncheon clubs and other community groups; style bars for the effective presentation of the style story. Never before have there been so many favorable forces pulling together to achieve a common goal.

In addition, the successful administration of any multiple prescription program must be firmly rooted in a convenient financing plan for the patient. Two or three pairs of spectacles for an individual, plus the professional vision care needed for other members of his or her family can add up to a very substantial sum. This is why, so often, other needed examinations are frequently postponed and other needed prescriptions deferred, as an ideal difficult of attainment. But when a comprehensive program of eye care can be offered for only a few dollars a week or month, patients are able to accept professional recommendations.

Recently my attention has been called to a financing program sponsored by the Charge Account Bankers Association. Their plan is ideally suited to the needs of the professional man and is already being adopted in some areas.

It is my understanding that their association is planning to distribute to the ophthalmic professions a booklet telling about their program and how it can be locally adapted. It seems to me that this booklet will deserve a careful reading on the part of everyone who is interested in providing for the multiple visual needs of patients on a basis which the patient will find financially practical.

HOW OPTOMETRISTS MAY PARTICIPATE

There are three logical steps in developing a program for telling patients about multiple visual needs. They are summed up in the words, "assimilation, selection and utilization."

First, the optometrist should *assimilate* everything he can lay his hands on pertinent to the subject. The material may be found in professional journals; in releases from manufacturers of ophthalmic materials and in literature from organizations within the profession. Much also may be learned by talking to salesmen about corollary materials.

Then comes the process of *selection*. Optometrists should keep a folder entitled "Multiple Visual Needs" into which is placed all the useful ideas encountered in reading. The ideas that will be adopted immediately should be underscored in red. This file will become a stockpile and source of inspiration.

From this stockpile the optometrist will *utilize*—exactly what tools he will adopt and what procedures he will follow. Successful practitioners tell us that the important thing is to use these ideas consistently day after day, not casually or haphazardly, developing the right work habits rather than following the old routine. While it may be a little difficult at first, they say it is essential that new ideas and new techniques that are geared to the new concept be adopted and made to fit to the patient's needs.

Most important, they say, is the need for convincing oneself that what he is planning to do is for the patient's good. They tell us that no patient should ever be allowed to leave the office without an exposure to this concept—the enjoyment and the satisfaction that can be derived from having the right eyewear at the right time.

It is work—to study, to read, to evaluate, to adapt. It may be real self discipline to force oneself to do the things that need be done. But it has been amply documented that such an effort pays off in better service to patients, in enhanced public acceptance, in the consistent growth of the professional practice.

THE PROGNOSIS IN STRABISMUS*

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Literally, prognosis means a knowing beforehand, a forecast. In medicine it is taken to mean the foretelling of the probable course of a disease, injury, or defect. When the related mortality rate is high, the word prognosis usually refers to the probability of survival. When the condition is less serious, prognosis usually pertains to the probability of recovery with a minimal loss of function. Obviously, the prognosis depends upon what, if anything, is to be done. Thus, in an otherwise healthy adult found to have a tracheal cancer, the prognosis for survival could be quite different from the prognosis for the return of normal respiratory function. Either prognosis in this case might depend upon whether the treatment consisted of surgical intervention, X-radiation, or vitamin ingestion. To avoid possible ambiguity or misunderstanding, a statement of the prognosis should include what is being predicted and upon what form of treatment, if any, the prediction is based. Whenever the prognosis does not include the form of treatment, it is commonly assumed that any or all accepted forms of treatment will be employed.

The accepted forms of treating strabismus are with correction lenses, added lenses, prisms, occlusion, orthoptics, and surgery. Prognosis in strabismus is commonly based upon either a restoration of normal binocular vision (a *functional cure*), or an improvement in the appearance of the eyes (a *cosmetic cure* when the strabismus is no longer noticeable and a *cosmetic improvement* when the strabismus is less noticeable than previously). Specific criteria for evaluating success in treating strabismus have not been universally adopted. The lack of uniform definitions and standards is a major problem in the prognosis of strabismus. What a functional cure is to one clinician may not be to another; what a cosmetically unnoticeable strabismus is to one clinician may not be to another.

In considering the matter of prognosis in strabismus, we shall discuss separately (a) the prognosis for outgrowing strabismus, (b)

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†Optometrist. Ph.D., Member of faculty. Fellow, American Academy of Optometry.

the prognosis for a functional cure, (c) the prognosis for a cosmetic cure or improvement, and (d) the clinical value of prognosis.

PROGNOSIS FOR OUTGROWING STRABISMUS

It is well known that epicanthal folds, a flat and broad bridge of the nose, and a small interpupillary distance can give the appearance of an esotropia when none actually exists, or can exaggerate the appearance of an existing esotropia. An *apparent* strabismus and an *actual* strabismus are entirely different conditions.

There is little doubt that children may outgrow an apparent strabismus. One who works a great deal with strabismus has no difficulty recalling such instances. However, it is difficult to recall a patient who simply outgrew an actual, constant strabismus. We know that suppression, amblyopia, eccentric fixation, and anomalous correspondence are frequently found in strabismus; we know that their presence makes the prognosis for a functional cure more unfavorable; we know that, with the probable exception of suppression, they are difficult to eliminate even with extensive orthoptics. For strabismus and its associated conditions to vanish spontaneously simply with time and growth seems to be too much to expect. If this did occur in a significant number of persons, then the frequency of functional cures by orthoptics ought to be much greater than it is. Orthoptics tends to extend over periods of several months, and thus it is reasonable to expect that some of these spontaneous cures, if they occurred, should be observed during orthoptics.

It is probably safe to assert that few persons ever outgrow a constant strabismus. Consequently, a strabismus confirmed to be constant, or nearly constant, most likely will persist throughout the patient's life if no treatment is undertaken.

PROGNOSIS FOR FUNCTIONAL CURE

Several years ago at the University of California School of Optometry a long-range and continuing study* of strabismus and orthoptics was begun. Among other purposes the study was to establish acceptable criteria for a functional cure of strabismus, and to analyze various factors in strabismus for their possible influence on the prognosis. Results from the study are soon to be published. For the present discussion we may refer to a two-year preliminary report prepared in 1954 for the Research Projects Committee of the American Academy of Optometry.

The criteria for a "functional cure" of strabismus, as adopted at the beginning of the U.C. study, were as follows: Clear, confortable,

*Supported in part with funds from the American Academy of Optometry.

single binocular vision must be present at all distances up to the near-point of convergence, which is normal itself; there must be stereopsis and normal ranges of motor fusion; an occasional turning of the eyes may occur (up to about 1% of the time) providing diplopia is experienced whenever this happens; correction lenses and small amounts of prism (up to 5Δ) may be worn if necessary.

A second set of criteria was adopted for the category of "almost cured." In this category a patient may lack stereopsis, may exhibit strabismus with diplopia up to 5% of the time, and may need larger amounts of prism to maintain comfortable binocular vision. In all other respects the patient must meet the criteria for "functional cure."

Categories of "moderate improvement" and "slight improvement" were adopted for those patients for whom the main improvement was, respectively, in more than one, or in only one, of the defects associated with the strabismus. The category of "no improvement" was adopted for those patients for whom there was no significant improvement in the strabismus or its associated defects.

In the U.C. study it was found that the prognosis for a functional cure depended upon the kind of strabismus and the presence of certain associated conditions. In general the prognosis for a functional cure was more favorable for occasional strabismus than for constant strabismus, for comitant strabismus than for incomitant strabismus, for exotropia than for esotropia, and for smaller angles than for larger angles of strabismus. Eccentric fixation and cyclotropia were unfavorable factors both in esotropia and exotropia. In esotropia, anomalous correspondence or a lack of motor fusional movements detracted from the prognosis; interestingly these factors did not influence the prognosis in exotropia. In esotropia, and to a somewhat lesser extent in exotropia, the prognosis for a functional cure was worsened by the presence of suppression, amblyopia, or incomitancy. A family history of strabismus or a present age between seven and eleven years improved the prognosis for a functional cure in esotropia. Good cooperation generally made the prognosis more favorable.

A model was conceived to demonstrate the manner in which these various factors influenced the prognosis for a functional cure (see Figure 1). The model is based on the concept of a beam balance. For each factor found to be present, a weight is placed on the beam at a distance from the fulcrum proportional to its influence on the prognosis. All the factors shown in the model influence the prognosis in esotropia; only those designated with an asterisk act in exotropia. The more

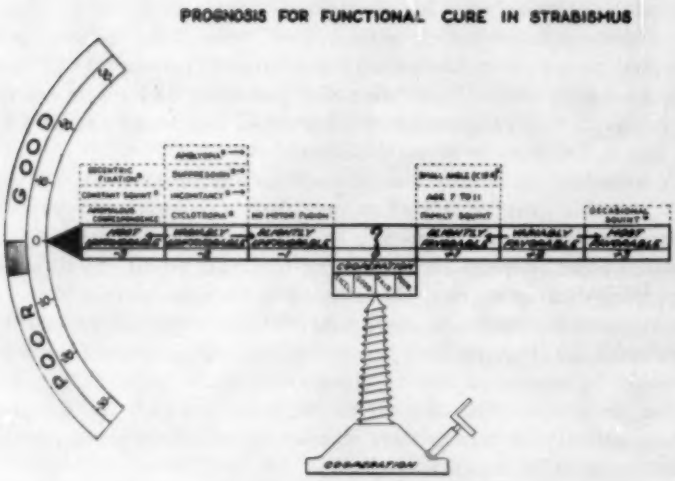

Fig. 1.

marked the degree of amblyopia, suppression, incomitancy, or cyclotropia, the farther from the fulcrum should the weight be placed. Since the prognosis was affected less in exotropia than in esotropia by the same degrees of amblyopia, suppression, or incomitancy, the weights for these factors should be placed closer to the fulcrum in exotropia (as designated by the arrows in the model). Greater cooperation improves the prognosis either by shifting the fulcrum to the left or by cranking the handle at the base of the screw in a clockwise direction to raise the beam. The shaded area between "good" and "poor" on the prognosis scale represents a prognosis that might be labelled "fair."

Attempts were made when developing the model to take account of the association and interaction between various factors in strabismus.* To a limited extent these attempts were possible. More sophisticated methods of analysis are currently being used to study these associations and interactions. If possible, the results will be embodied within the framework of the existing model; if not, a new model or schema will be adopted.

*For example, anomalous correspondence was found to be strongly associated with constancy in esotropia. Perhaps the combination of anomalous correspondence and constancy gives a probability for cure which is significantly less than the simple product of the probabilities for each factor when present alone. Or, the combination of anomalous correspondence and constancy may give a probability for cure that is the same as that for one of the factors alone since it might be a "dominating factor."

Of pertinence to the present discussion is the fact that a model can be very helpful in assessing the prognosis in strabismus because of the many factors which bear on the prognosis for a functional cure.

PROGNOSIS FOR COSMETIC CURE OR IMPROVEMENT

The functional cure of a strabismus almost invariably produces an improved appearance of the eyes. There are times, however, when a functional cure is neither probable nor desired. Whenever a strabismus is cosmetically noticeable, the prognosis for a cosmetic cure or cosmetic improvement becomes potentially important. Surgery is the usual treatment upon which the prognosis is based, although added lenses or prisms are occasionally used. Generally, the surgical prognosis for a cosmetic improvement is fairly good; for a cosmetic cure it is somewhat less. For both improvement and cure, the prognosis is reduced when there is a deep amblyopia, eccentric fixation, anomalous correspondence, marked incomitancy, or cyclotropia.

One of the problems when a functional cure is not obtained after surgery is that the strabismus may be unnoticeable for a while only to become larger and more noticeable later on. When this occurs, a second operation may be necessary at a later date.

THE CLINICAL VALUE OF PROGNOSIS

After the examination is completed the patient usually expects a description and discussion of his strabismus. He further expects an enumeration of the kinds of treatment that might be beneficial to him, and a specific recommendation of a course of action. This recommendation leans heavily, but not entirely, upon the prognosis. There are at least three other considerations that are helpful in advising the patient: (a) the conspicuousness of the strabismus, (b) the degree of concern about the strabismus by the patient and his family, and (c) any special visual requirements that exist or are contemplated.

The optometrist usually assesses the conspicuousness of the strabismus by questioning the patient and his family, and by directly observing the eyes. Strabismus generally is not noticeable to a lay person when it is less than about 20Δ of esotropia, less than about 15Δ of exotropia, or less than about 10Δ of vertical heterotropia. As a rule, strabismus is more noticeable when it is alternating or when it is occasional. An esotropia is more easily detected when there is epicanthus, small interpupillary distance, or negative angles kappa. An exotropia is more noticeable when the inner canthus is especially well-formed, when the interpupillary distance is large, or when angles kappa are positive. In vertical heterotropias, the appearance may be influenced by the position of the lids, ptosis, or vertical asymmetries of the orbits.

Related to the matter of the appearance of the eyes is the patient's and family's concern about the strabismus. Most, but not all, patients with a noticeable strabismus are concerned about the appearance of their eyes and proper binocular functioning. However, the degree of concern is quite variable. Some patients will go to any length to obtain normal binocular vision, while others are interested in treatment only if they are not to be greatly inconvenienced. It is not necessary for the optometrist to make the patient become concerned about his strabismus. This is especially true when the prognosis for any improvement is poor. It is remarkable how such things as a serious attitude or a barely audible "tsk, tsk" during the examination can induce the patient to worry about his strabismus unnecessarily. It is the patient's original attitude about his eyes that is important, not the attitudes that the optometrist can induce the patient to develop.

Any special visual requirements related to the patient's vocation or avocation should be known before advice is given. In some vocations extremely good binocular vision is needed; in others a strabismus of certain kinds may actually be desirable. It is surprising how few jobs or hobbies really demand normal binocular vision.

When the prognosis is based on good judgment and is tempered with an evaluation of the patient as a human being, it becomes an invaluable aid in recommending the kind of treatment for a strabismus.

AMERICAN ACADEMY OF OPTOMETRY

MEMBERS VOTE ACADEMY DUES INCREASE

The official Academy returns on the membership ballot to increase annual Academy dues from $15 to $20 a year, as certified by the Academy canvassing board on October 1, are as follows:

Votes favoring proposal	302
Votes opposing proposal	101
Incorrectly marked ballots	8

Slightly under half of the members voted. As provided in the By-Laws the votes of members who failed to return their ballots have been transferred for disposal to the Executive Council who have voted them in the affirmative.

JOHN W. HIER, O.D.
CHARLES R. WOLF, O.D.

AN EVALUATION OF THE CHILDREN'S VISUAL ACHIEVEMENT FORMS AT GRADE I*

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The present study was designed to determine the relationship of the Children's Visual Achievement Forms to reading achievement, intelligence, handwriting, and to visual efficiency among first-grade children.

BACKGROUND OF THE STUDY

Research and expert opinion have supported the conclusion that visual perception is closely related to early progress in learning to read. Nevertheless, there is still uncertainty about the most useful way to measure visual perception for predicting reading achievement among young school children.

A detailed study of this topic was made by Goins[1] who used fourteen experimental tests of visual perception with 120 pupils in Grade I. A factor analysis of her data revealed two major factors related to reading. One was designated as the ability to hold in mind a perceptual gestalt during rapid perception, which requires simple discrimination. A second factor required the pupil to keep in mind a configuration against distraction. Furthermore, two of her tests tended to produce bimodal distributions, and were related to reading, but did not require copying of forms. However, one test called "Pattern Copying" yielded a coefficient of correlation of +0.519 with achievement in reading.

A second example is the attempt by Harrington and Durrell[2] to evaluate the contribution of mental maturity, auditory and visual perception, and phonics to reading achievement. Their subjects were 500 pupils in Grade II of five parochial schools in Boston. They held

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three variables constant by matching pairs, and by partial correlation while they tested the contribution of the fourth. The results obtained from both techniques revealed that visual discrimination was most closely related to reading. But copying forms was not used as a testing technique in this study.

Many of the reading readiness tests have included tests of symbol identification, and as early at 1935, Monroe[3] required pupils to look at a simple form for five seconds, then to copy it from memory. Bender[4] found that children's ability to copy forms varied at different developmental levels. Likewise, Gesell[5] reported that among young children, the ability to copy simple forms was related to perceptual ability and that there were developmental differences among children.

In 1949, Potter required her 176 first-grade subjects to copy forms and found a correlation coefficient of +0.30 between copying correctly without reversals, and reading achievement. When mental age was held constant, the correlation coefficient dropped to +0.18. She concluded that ". . . ability to reproduce from memory the direction element in the stimulus has little value in estimating any individual child's potential reading ability."[6]

Townsend reported a coefficient of correlation of +0.60 between copying and form perception, which was significantly higher than the relationship between copying and motor coordination. But he concluded that "measures of either mental age or form perception which rely on copying responses may be unreliable in that copying in and of itself is an unpredictable variable in the subject and in the type of copy to be made."[7]

The foregoing were selected as examples of research dealing with copying forms related to reading. The conclusions one may draw are: (1) that some types of form-copying tests show a significant positive relationship to reading while others show insignificant relationships; and (2) that form-copying varies among children at different developmental levels, but may be an unreliable measure of form-perception.

However, a new test of form-copying came to the attention of the investigators, because it was recommended to teachers and optometrists as a means for predicting reading failure among young school children. An example of the publicity concerning children with unsatisfactory performance on this test follows: "Their ability to comprehend visual symbols is impaired due to visual stress, not in receiving incoming stimuli, but in interpreting the stimuli and reproducing it. These will be poor readers." (Reprinted from the ORLANDO SENTINEL, July 16, 1956.)

Further investigation revealed that during 1954-55, Charles W. and Esther Ingram McQuarrie had selected seven distinctly different forms which were administered to every child (N = 1510) in the first three grades of The Winter Haven, Florida, Public Schools. Each pupil copied each of the seven forms, shown in Figure 1. Each form

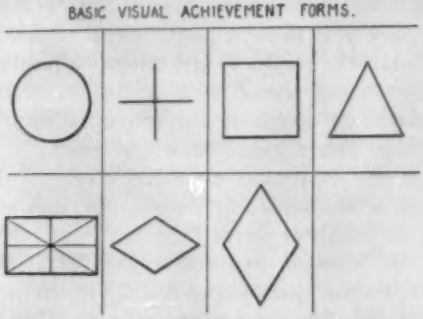

FIGURE 1

was scored high, average or low. Teachers' judgments of school achievement were assumed to be equivalent to level of reading achievement in the first three grades. The data were analyzed statistically by Lowder who concluded that "There is a significant relationship between perceptual ability and school achievement."[8] This conclusion was based on tetrachoric correlations using the upper and lower 27 per cent of the distribution of achievers, and above and below average copying performance. At first grade, he found a correlation coefficient of +0.45 which was reduced to +0.29 when mental age was held constant. Although these coefficients were statistically significant when tested against a "no difference" null hypothesis they are much too low for appreciable accuracy in individual prediction.

The seven forms were incorporated into a booklet in 1955 and named the Children's Visual Achievement Forms.[9] The "Foreword" states that the forms are for "Teachers and others interested in the visual care of children." The directions state that at seven years of age "When a child is unable to copy these forms, or distorts them while drawing, he is operating below the expected visual performance level of a seven-year-old child." While not directly stated, the implication is made that performance in copying these forms is useful in selecting children with visual problems.

Recently Kosiba used these forms and the Chicago Reading Test with 77 pupils in Grade V. He found a correlation coefficient of −0.09

between the two tests and concluded that "Achievement on the Children's Visual Achievement Forms is not related to reading achievement at the fifth grade level."[10] This study, which was carefully done, indicated that the test was of doubtful value beyond fourth-grade.

It seems clear that if the Children's Visual Achievement Forms are good predictors of reading achievement and/or visual abilities in the early grades, they will be exceedingly useful to schools. However, it is essential to relate the results of the Forms to reading achievement, rather than academic achievement as estimated by teachers. Furthermore, it is important to determine the predictive value of the Forms for the same children over a period of several years.

HYPOTHESES TO BE TESTED

On the basis of the foregoing reports, the following hypotheses were formulated for pupils at Grade I:

I. That level of performance on the *Children's Visual Achievement Forms* (hereafter called CVA) is positively related to intelligence as measured by group tests. This hypothesis was formed because most group tests of intelligence at the primary-grade level require copying of forms.

II. That level of performance on the CVA is an unsatisfactory means for predicting reading achievement as measured by two standardized reading achievement tests. This hypothesis was based upon the low individual prediction obtained by Lowder, and the report of unreliability of children's behavior in copying forms.

III. That level of performance on the CVA is positively related to skill in handwriting. Research relating to this hypothesis was not found in the literature. Hence this hypothesis was developed because the two abilities appear to have many common elements, and also because handwriting is one of the aspects of school achievement in the first-grade.

IV. That level of performance on the CVA is a satisfactory means for identifying pupils who should be referred to a refractionist. This hypothesis was included because of the implication of the value of the test to optometrists.

PROCEDURE

SUBJECTS:

The subjects for this study included all pupils in Grade I, enrolled in the two schools and three classrooms of District 48, Dupage County.* All of the 87 pupils were tested during the second semester of 1957.

*Special appreciation is hereby expressed to Mr. John Albright, Superintendent of Schools, and the three teachers of Grade I.

In May, near the end of the school year, their chronological ages ranged from 6 years, 2 months to 8 years, 4 months with a median at 6 years, 11 months.

TESTS:

The CVA, which is the primary concern of the study, was administered according to the directions in the Teacher's Edition of the Forms. Two pupils copied each form while the examiner marked essential items for scoring (such as direction in the circle) on a blank designed for this purpose. All forms were administered by two of the investigators, and scored independently by each. Each set of copied forms was scored by comparing them with Lowder's samples as high, average or low. Then each set of forms was scored, again independently, by the point system recommended in the Teacher's Edition of the forms to be copied.

A group test of intelligence. The Kuhlmann-Anderson Test (Princeton, N. J.: Personnel Press, 1952) was given and scored by one of the investigators in February and rescored by a research assistant. On this test, the range in Intelligence Quotients was from 89 to 131 with a median at 114. Therefore, these subjects were somewhat more intelligent than average pupils.

The sample of handwriting required each pupil to write his name (in manuscript without copy), and to copy from the chalkboard sample, the digits 0-9, and two sentences which involve all of the letters of the alphabet. The samples were scored by one of the investigators, using a scale developed by the Laboratory School at the University of Chicago. It included such items as: formation of letters, slant, spacing, alignment, and quality of line. The resulting scores ranged from 15 to 85, with a median of 42.

Reading achievement was measured by two tests given in May. The first test measured word discrimination only, and does not involve meaning. The *Word Discrimination Test*, Form A (Experimental Edition by Charles B. Huelsman, Jr.) was used for this purpose. The second measure of reading was *The Chicago Reading Tests*, A2 (Eau Claire, Wisconsin: E. M. Hale, 1940). The latter purports to measure comprehension of words, phrases, sentences, directions and paragraphs. These tests were administered and scored by the teachers and rescored by a research assistant. Reading achievement ranged from grades 1.4 to 3.6 with a median at grade 2.2.

A visual examination of each pupil was done in May, under the direction of one of the investigators. The visual examination included: measures of acuity at far and near; internal and external ocular examination; a thorough analysis of functional vision at far and near;

motion skills (rotations, pursuit, and saccadic fixations); and preference tests of eye, hand, and foot.

LIMITATIONS OF THE STUDY

The investigators recognize the following limitations of this study:

1. The sample of pupils is somewhat above the average in intelligence.
2. The investigation is concerned with first-grade pupils only. However, if the same pupils are retested at the end of Grades II, and III, this limitation will be eliminated.
3. The report that follows does not include an analysis of all of the data. For example, Lowder found that the scores on the horizontal diamond and the divided rectangle were the best predictors of reading achievement. (However, this fact is not mentioned in the forms now available.)
4. The results of the visual study are not yet completed.

ANALYSIS OF THE DATA

The scores for each pupil on each of the foregoing tests were recorded. Since the CVA Forms were to be evaluated, special attention was given to the distribution of these scores, obtained by the point system and by the Lowder methods of assigning ranks of high, average, and low to each of the seven forms that were copied. In order to obtain scores by the Lowder methods, numerical values were assigned as follows: high, 2; average, 1; low, 0. The possible range in scores was 0 to 14.

In view of the fact that information was not available concerning the meaning of the differences in the two methods of scoring the test, and that the ranges differed widely, all test scores (except the visual judgments) were ranked into 12 group-ranks. The ranked scores were then correlated.[11]

The correlation coefficients were tested for significance against the "no difference" null hypothesis at the 1 per cent level of confidence, and were placed in an 8 x 8 matrix for factor analysis. The matrix was factored three ways, using Wright's simple two-way structure method.[11]

The visual data have not been analyzed to the satisfaction of the optometrists. Data on this part of the study will be included in the next report.

FINDINGS OF THE STUDY

1. THE RELIABILITY OF RATERS

The intercorrelations among the different tests are shown in Table I. The first four columns and four rows reveal the reliability of

TABLE I
COEFFICIENTS OF INTERCORRELATION AMONG SCORES

	1 CVA (Points) Rob.	2 CVA (Lowder) Rob.	3 CVA (Points) Mozzi	4 CVA (Lowder) Mozzi	5 Intelligence	6 Word Discrimination	7 Chicago Reading	8 Handwriting
1. CVA (Points) Rob.	(1.00)	0.67	0.82	0.40	0.23	0.24	0.41	0.23
2. CVA (Lowder) Rob.	0.67	(1.00)	0.74	0.76	0.25	0.37	0.44	0.39
3. CVA (Points) Mozzi	0.82	0.74	(1.00)	0.60	0.36	0.28	0.41	0.37
4. CVA (Lowder) Mozzi	0.40	0.76	0.60	(1.00)	0.19	0.35	0.38	0.43
5. Intelligence	0.23	0.25	0.36	0.19	(1.00)	0.54	0.59	0.37
6. Word Discrimination	0.24	0.37	0.28	0.35	0.54	(1.00)	0.79	0.35
7. Chicago Reading	0.41	0.44	0.41	0.38	0.59	0.79	(1.00)	0.31
8. Handwriting	0.23	0.39	0.37	0.43	0.37	0.35	0.31	(1.00)

All coefficients have a positive sign.

the ratings of the same drawings, when scored by two methods, and by two raters independently. It should be noted that when Robinson scored the tests according to the Lowder plan of high, average, and low, and by the point plan recommended in the manual, the coefficient of correlation was only +0.67, while Mozzi's two ratings yielded a coefficient of +0.60. It seems clear that while the two methods of scoring are related, one cannot confidently be substituted for the other.

Next, it is significant that scores obtained by the two raters correlated +0.82 using the points, and +0.76 using Lowder's method. Thus the reliability of independent raters is not as high as Lowder reported when his raters scored each copy simultaneously. The method used in this study more nearly approximates that of teachers who may use the forms without consulting others.

2. RELATIONSHIP OF THE CVA TO INTELLIGENCE

To test the first hypothesis, that level of performance on the CVA is positively related to intelligence as measured by the Kuhlmann-Anderson test, the first four coefficients of correlation in row 5, Table I, should be examined. The first two, +0.23 and +0.25 are significant at the 5 per cent level of confidence. The third, +0.36, is significant at the 1 per cent level, while the fourth, +0.19, is not significant. Thus the relationships are positive but low, and the determination of whether they are significantly different from zero depends upon the rater and the method of scoring used.

A second way of testing this hypothesis is by examining the factor pattern when intelligence is the first factor and reading achievement the second. The resulting factor plots, shown in Figure 2, reveal that the four ratings of the CVA have more direct relationship with reading achievement than with intelligence.

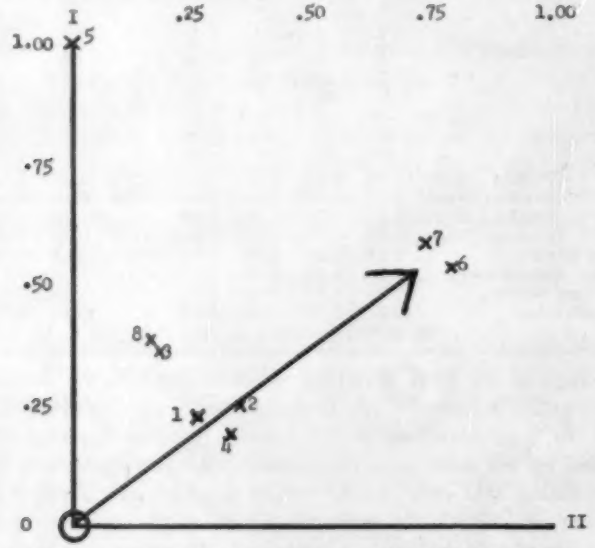

Fig. 2.—Intelligence Plotted Against Reading Achievement.

1. CVA — Points — Robinson
2. CVA — Lowder — Robinson
3. CVA — Points — Mozzi
4. CVA — Lowder — Mozzi
5. Intelligence
6. Word Discrimination
7. Chicago Reading Test
8. Handwriting

Thus, the two methods of testing hypothesis I confirm it only to a very limited degree, and tend to show that the predictive elements of the CVA are somewhat different from those of the intelligence test.

3. RELATIONSHIP OF THE CVA TO READING ACHIEVEMENT

The second hypothesis states that level of performance on the CVA is not a good predictor of reading achievement, when intelligence is held constant. To test this hypothesis, the coefficients of correlation were calculated and are shown in the first four entries in rows 6 and 7 of Table I. All eight coefficients are positive and significant at the 1 per cent level. They range from +0.24 to +0.44. Of special interest is the fact that all coefficients between the CVA and the measure of word discrimination are lower than those between the CVA and the

Chicago Reading Tests. This relationship was not anticipated, because it was reasoned that form copying would be more closely related to a measure of word discrimination than of general reading. Although these relationships are significantly positive for the group, the coefficients are low for the prediction of individuals.

Two statistical techniques were used to test hypothesis II. First, a partial correlation between the CVA and word recognition was done, holding intelligence constant, and the resulting coefficient was +0.34. Second, an examination of factor plot shown in Figure 2 reveals the low relationship between the CVA rating (1, 2, 3, 4) and the reading tests (6, 7).

In addition, 10 of the 87 pupils obtained scores on the CVA below 60, which is purported to be the minimum for "learning to read easily for meaning."[12] Of these pupils, five scored below the national norm on the Chicago Reading Test and five scored at or above this norm. It is clear that a score below 60 on the CVA identified as many good readers as poor readers.

Hence the analyses of the test data support hypothesis II, that the CVA is not a good predictor of reading achievement, even though

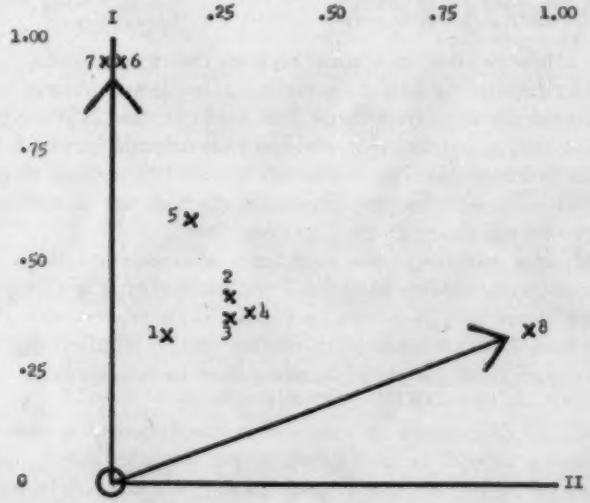

Fig. 3.—Reading Achievement Plotted Against Handwriting.

1. CVA — Points — Robinson
2. CVA — Lowder — Robinson
3. CVA — Points — Mozzi
4. CVA — Lowder — Mozzi
5. Intelligence
6. Word Discrimination
7. Chicago Reading Test
8. Handwriting

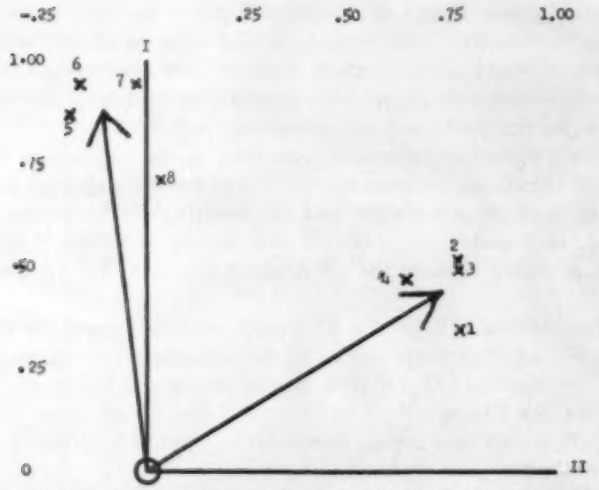

Fig. 4.—Intelligence, Handwriting, and Reading Achievement Plotted Against CVA.

1. CVA — Points — Robinson
2. CVA — Lowder — Robinson
3. CVA — Points — Mozzi
4. CVA — Lowder — Mozzi
5. Intelligence
6. Word Discrimination
7. Chicago Reading Test
8. Handwriting

there is a low positive correlation between the two measures.

4. RELATIONSHIP OF THE CVA TO SKILL IN HANDWRITING

To test the third hypothesis, that scores on the CVA are positively related to skill in handwriting, the first four columns in row 8 of Table I should be inspected. The coefficients of correlation range from +0.23 to +0.43. These coefficients, except for the first, are of sufficient magnitude to be significant at the 1 per cent level.

A factor analysis of the coefficients of correlation given in Table I was done using reading as factor I and handwriting as factor II. The resulting factor plot is shown in Figure 3. It is clear that the CVA ratings have low relationships to reading and to handwriting, but that they are more closely related to reading than to handwriting.

5. SCHOOL ACHIEVEMENT AND THE CVA

School achievement in Grade I is based largely on reading and handwriting, as well as intelligence. Other attitudes and abilities which are more subjective were not considered in this study. A factor analysis in which intelligence, reading and handwriting were included as factor I, and the CVA scores as factor II is shown in Figure 4. The factor-plot shows the relative independence of these scores, and reveals that the CVA scores do not predict academic achievement or general ability with any degree of confidence.

CONCLUSIONS AND INTERPRETATION

This study, which was made to evaluate, at Grade I, the Children's Visual Achievement Forms (called CVA) for the purpose of predicting reading achievement, skill in handwriting, and the need for visual examination appears to merit the following conclusions:

1. The CVA is an unsatisfactory means for predicting level of intelligence, reading achievement, or handwriting among first-grade pupils of the type used in this study.

2. The values of the CVA for use by teachers are limited, because of the low individual prediction of reading achievement and because the test must be administered on an individual basis. Scoring also is time-consuming. Other tests of visual perception with somewhat higher individual predictive value can be administered to groups. Furthermore, considerable subjectivity in scoring the CVA has been demonstrated.

3. The predictive values of the CVA, given at Grade I, need to be studied further in relation to the achievement and the visual abilities of these pupils as they progress to Grades II and III.

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NEAR POINT DIAGNOSIS AND VISUAL TRAINING WITH THE PRISM READER*

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The purpose of this report is to discuss a new diagnostic procedure and to mention a visual training method made possible with the Prism Reader[1] which enable optometrists to cooperate more effectively with educators in the solution of school problems. Every optometrist has had the experience of worried parents asking: "Why does my child have so much trouble with his schoolwork? He seems to be intelligent."[2]

The examination of such patients with the procedure to be presented has revealed deficiencies in their visual mechanism that ordinarily have not been considered and recognized as basic causes of reading difficulties and general maladjustment.

The first step in this procedure is to make use of the functional readiness questionnaire which follows:

1. Why did you come to see me?
2. Do you wear glasses? Yes No Sometimes
   How long?
   Have they been changed recently? Yes No
   For near and/or far visual tasks?
   Comfortable? Yes No
3. Do you have difficulty seeing in the distance or the print in a book clearly? Yes No Sometimes
4. Do you like to read? Yes No Sometimes
5. Do your eyes either smart, burn, or fill with tears when you read or study? Yes No Sometimes
6. Do you have headaches from reading? Yes No Sometimes
   From movies? Yes No Sometimes
   From television? Yes No Sometimes
7. Do you find it difficult to get up in the morning, or do you get tired and sleepy when reading? Yes No Sometimes
8. Do you find it difficult to concentrate, sustain effort and comprehend in reading and study activities? Yes No Sometimes
9. Do you see double sometimes (such as two objects at a distance or two words just alike when there is really only one)? Yes No Sometimes
10. Do you have a stiff neck or a backache after you read and study for an extended time? Yes No Sometimes
11. Do bright lights or sun light make you uncomfortable? Yes No Sometimes

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12. Do you experience car sickness (front or back seat or both) or have any nervous indigestion before, during or after school?.....Yes No Sometimes

Comments and Observations:

This questionnaire is designed to furnish the optometrist with information concerning the patient's visual adjustment. In addition to usual questions, particular emphasis is placed upon information directly related to reading and study activities.

For example, Question 4—"Do you like to read?", is a simple direct question the ramifications of which are normally overlooked. It should not be interpreted as "Would you like to read?" If there is any hesitancy in answering the question, *no* should be circled. Parents often are unaware of their child's negative attitude toward reading and learn of it for the first time in your office. A college student or adult sometimes is surprised when his own answer is negative.

Question 8—"Do you find it difficult to concentrate, sustain effort and comprehend in reading and study activities?"—is another key question. The inability to sustain effort is the most frequent single factor noted at all educational levels among those who either are academically retarded or are working below their intellectual potential. Reading difficulties may only be symptoms of functional impediments which prohibit the individual from sustained effort or responding satisfactorily to class room instruction.[3, 4]

The functional readiness questionnaire not only is helpful in securing information and establishing proper rapport with the patient, but also is helpful to the optometrist in explaining the patient's problem.

The prism reader has been developed to assist the practitioner in diagnosing and treating anomalies of binocular vision. Figure 1.

Normal binocular vision is a complicated psycho-physiological process which is not attained to its fullest extent by all who see with both eyes. In determining the effective level of binocular coordination, the optometrist is interested in measuring the extent of development of the fusion faculty as well as the degree of coordination between the vergence and focus mechanisms.

Fusion is the desire to superimpose and blend the respective images of two eyes so that only one is seen. Fusion is the end result brought about by the desire of the individual to avoid the confusion of double vision, or the burden of suppressing the vision of one eye. Acquired reflexes such as fusion, are ontogenetic[5] and, therefore, must be considered in terms of the whole individual. Fusion may be affected by disease, fatigue, nervousness, and general physical weakness in addition to deficiencies in ocular functioning.[6]

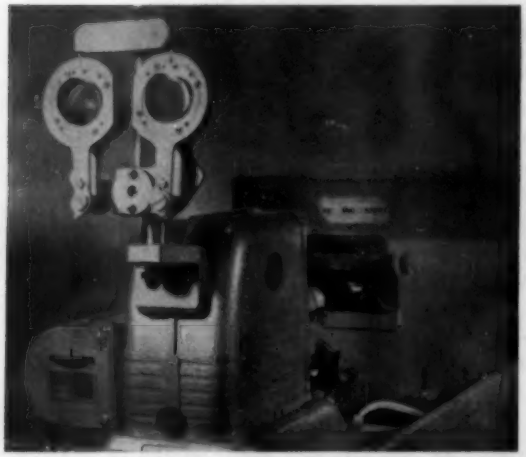

Fig. 1.

Normal binocular vision requires that the individual coordinate vergence function which enables him to maintain single vision with focus mechanism which enables him to see clearly. The eyes must perform two acts simultaneously: Posture themselves so as to produce a single image, and accommodate in order to produce a clear image. As a result of persistent repetition, the simultaneous behavior pattern of these functions are conditioned to react as associated reflexes.[7] The degree of this association of the two functions is variable in different individuals. In fact, it is not necessarily consistent in the same individual at all times.

In making a visual analysis, the relationship between these functions is investigated at the reading distance with the prism reader. From these data, the examiner determines whether or not the individual will be able to maintain confortable, single binocular vision under all conditions of seeing and accept whatever lenses may be required.

Figure 2 presents a schematic profile of the prism reader. Two mirrors increase the length of the optical path between the projector and screen resulting in an image which measures 6″ x 1″. The parallelogram-like exposure has been created by inserting a spirally grooved cylinder in the projection system in front of the film. This moving slot measures 3″ x 1″ and includes approximately three words.* The

*The average span of recognition for a college student reading 340 words per minute is 1.33 words per fixation, i.e., less than the 3 words in the slot.[8]

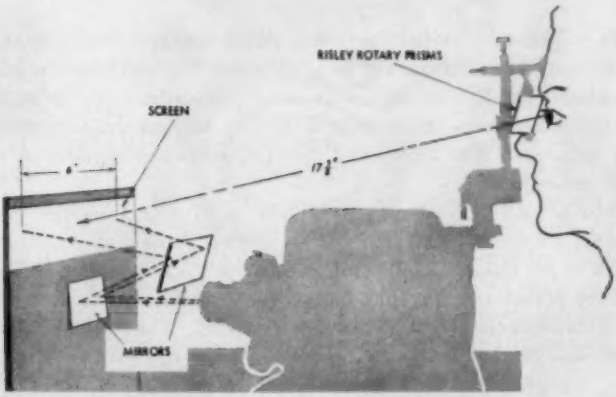

Fig. 2.

speed of the prism reader is variable from zero to 170 lines, or about 1,200 words per minute.

The prism head is comprised of two Risley rotary prisms each 30 millimeters in diameter. Each prism may be continually varied from thirty prism diopters base-in to thirty prism diopters base-out. The total prism range is sixty prism diopters base-in to sixty prism diopters base-out. The distance between the geometric center of the prisms (P.D.), has been calibrated between 48 and 77 millimeters and may be read directly from a scale. A forehead rest is provided.

Fifty graded film strips are available. The strips includes a picture-readiness film; an arithmetic film; 4 films for each grade through grade six; 8 junior high school films; 7 high school and college films, and 9 adult films.

Each film is 350 lines in length. For example, when set at a rate slightly faster than the average junior high school reader, thirty-five lines (245 words) per minute, the films run for ten minutes. Each line includes seven words of 20/60 type.

Before proceeding with the tests at the reading distance, the examiner should secure a quantitive phorometric measure of the binocular coordination at distance.

The following findings are recommended: (1) Lateral phorias: a. without correction in hypermetropia, b. with correction in all cases. (2) Divergence. (3) Convergence. (4) Vertical phorias and ductions.

For the visual analysis record three tests are considered at the reading distance: (1) Amplitude of accommodation, (2) Index of functional readiness and (3) Accommodative facility.

(1) The amplitude of accommodation[9] is measured first to assist the practitioner in determining: (a) Whether the amplitude is adequate (more than 3.00 D.) to see the print in the reader. (b) Whether the amplitude is adequate (more than 5.00 D.) to pass the accommodative facility tests. (c) The amount of convex lens power required at near in cases of presbyopia.

The second step in this procedure is to determine the index of functional readiness (I.F.R.).[1a] This is important and care should be exercised to see that it is obtained as accurately as possible. The patient should be seated comfortably before the prism reader and should be looking through the center of the rotary prisms. The examiner's instructions should be that while attempting to read, the patient is to follow the moving slot with his eyes and is not to move his head. The index is secured in this manner because more accurate information regarding the functional efficiency of the visual mechanism is revealed when the patient is looking at print and is using his eyes as he does in the act of reading. The patient must be made to understand that he may see extra letters in the words as the prisms are rotated; that he may see two words just alike side-by-side; or that he may see more than one moving slot. The prism power should then be increased to a point where he may actually see and understand just what he must look for during the test.

While determining the index, the speed dial of the prism reader is set from 20 to 30 lines per minute, depending upon the age and educational background of the patient. Because it includes shorter words, a film strip on the elementary level is used for testing purposes. No effort is made to check comprehension during the test. As the patient looks through the rotary prisms and follows the printed materials, the prisms are set in a base-in position, causing the eyes to diverge, and base-out causing the eyes to converge. It is important to rotate the prisms slowly, during the test, because a few individuals are so sensitive, as a result of their functional deficiencies, that they experience nausea and develop a headache if the prisms are turned too rapidly.

The prism power is gradually increased equally over each eye base-in and base-out until diplopia occurs, or until clear and single binocular vision is no longer maintained. It has been found desirable to begin the test by taking the divergence reaction two or three times. After the convergence reaction has been determined, the divergence response is repeated. It may be necessary to secure the divergence and convergence reactions from three to six times before recording the index.

The results of this dynamic performance test are recorded as follows:

$$\text{Index of Functional Readiness: I. F. R.} = \frac{\text{Divergence } \Delta}{\text{Convergence } \Delta}$$

The majority of patients show a higher convergence reaction than divergence reaction, but there are some instances where the divergence response is higher than that secured for convergence. Some patients are found, who have satisfactory vergence reactions but their focus and vergence functions are not adequately coordinated. In responding to the base-out prism, some individuals report that the print blurs out as the prism power is increased, but they do not experience double vision. If there is no indication of a suppression of vision either in one eye or the other, the point at which print blurs out is recorded as the convergence reaction. Some patients who ordinarily use both eyes together, either turn one eye in, as the divergence reaction is being secured, or turn one eye out, as the convergence reaction is being secured. With these individuals, the point at which the optometrist sees the eye begin to deviate is recorded as the divergence or convergence reaction. Some of those patients who are not conscious of diplopia (i.e. supress) will observe, however, that the whole instrument appears to move to the right or to the left away from the center as the prism power is increased. If the optometrist suspects that the patient is not recognizing diplopia, it is suggested that he ask the patient to look for this sort of left or right movement of the instrument itself.

All types of vergence reactions are found, but there is no concern with the fractions ½, ⅓ or ¼, as expressing muscle strengths or the power relationship between the divergence and convergence functions. For example, an index of 8/16 would not have the same significance as a 16/32 index.

The majority of less efficient students, as well as many better students, show a deficiency in both divergence and convergence. Better students, however, compensate, but the question is: Can they continue to compensate satisfactorily as the pressures of the curriculum increase in the upper grades? It should be noted, too, that so often what appears to be a satisfactory reaction on the usual phoria and muscle tests is not satisfactory for prolonged application. Securing an index of functional readiness tends to reveal such inadequacies, because it is a dynamic performance test taken under stress. It is exceedingly rare to find a student with school difficulties who has a satisfactory index and no indication of a sluggish focus.

Some patients compensate very obviously. For example, a college student may show a satisfactory convergence while complaining of pain and contorting his face during the test. This information is just as important to the examiner as the convergence finding itself.

Optometrists should be cautious in stating that an individual has a normal muscle balance as determined with the usual tests, as it can be demonstrated that what is adequate and normal for one patient is not adequate and normal for another. Furthermore, labeling a case as a convergence excess or convergence insufficiency is misleading since the connotation tends to overemphasize the necessity of training just one function. Unless *both* vergence functions receive attention during the training periods, the over-all visual problem often cannot be solved satisfactorily. Indexes obtained with the prism reader in which the divergence response is equal to or exceeds 19Δ, and the convergence response exceeds 39Δ, usually indicate that the individual has better ocular mobility, greater ability to sustain effort in nearpoint work, and a greater capacity to compensate for an abnormal phoria and to accept and use whatever lenses an optometrist may prescribe than those patients with lower vergence responses.

Almost all patients who suppress can be detected when the index is being determined. This phenomenon manifests itself in a variety of ways and seems to be a compensatory response which the individual makes in an attempt to make a more satisfactory visual adjustment.

Several types of suppression have been found in individuals having reading difficulties. Some of these can be detected only in a dynamic testing situation. A number of individuals tend to use only one eye in all visual tasks. Others tend either to suppress vision in one eye only in static situations or to suppress one eye on static tests and the other on dynamic tests. There are patients also, who suppress one eye only in dynamic near-point visual tasks. A few individuals have been found who apparently use both eyes in most visual tasks, but who tend to use only one eye for reading. It appears that as these patients begin to move their eyes in a left-to-right sequence, the vision of one eye is suppressed. Usually they are not conscious that this phenomenon is taking place. They may have good visual acuity, but often are found either to be anisometropic or to have an unequal accommodative facility in that there is a slower reaction of the focus mechanism in the suppressed eye. Still others suppress vision of one eye only when they are fatigued. Vergence difficulties are common in all of these cases.

Determining the facility of focusing is the third step in the proce-

dure being described. In non-presbyopic patients, it is not sufficient to determine whether they have the ability to accommodate at the reading distance in measuring the amplitude of accommodation. The ability to focus easily and rapidly is also necessary.

It has been demonstrated by means of reading graphs that there are some individuals who can read more efficiently with one eye than with both, even though they habitually either use or try to use both eyes together in reading. These patients generally have a low index of functional readiness (I.F.R.) and differences in rapidity of their accommodative responses. It serves no useful purpose to attempt to discover just how much difference actually exists. The important thing is to know that a difference does exist in the rapidity with which the two eyes respond in adjusting to distant as well as to near-point tasks. This finding helps to explain why some children and adults have difficulty in using their eyes together efficiently and yet show a satisfactory amplitude of accommodation.

Heretofore, focusing ability usually has been measured by one of three different methods: (1) Push up to blur, (2) the binocular addition to plus and minus spheres, until the first blur or blur out occurs while reading test type at thirteen and sixteen inches:[10] and (3) by accommodative rock without fixed convergence.[11] All optometrists are familiar with these tests.

The following tests, however, for determining accommodative facility, not only furnish the information usually obtained, but also enable the optometrist to secure definite indications of the rapidity with which the focus reaction takes place. Both a *dissociated* and a *fused* test have been included in order to secure information which helps the practitioner to answer two important questions: (1) Do two eyes focus at the reading distance with equal rapidity? (2) Do two eyes focus rapidly at the reading distance while the patient is maintaining single binocular vision?

Using a film representing the highest grade level which the patient can read, the reading rate of the prism reader is set at zero, where the same words remain exposed on the screen. The patient's prescription is inserted in the lens cells and it is ascertained that the patient can read the words on the screen. Next, the prism power base-in is gradually increased until the patient sees two exposures indicating that fusion is no longer present. The left exposure then is seen by the patient's left eye while the right eye sees the right exposure.

Now a +2.00 D. sph. is introducd before each eye and the patient is asked to indicate whether the words in the left or right exposure

become clear-first. Ideally, the two eyes should see the print clearly simultaneously as the patient looks back and forth from the left to the right exposures. Clinically, if there is no more than a two-second difference between the reactions of the left and right eyes, the patient passes the test. If the difference in the reactions of the two eyes is greater than two seconds, however, the test is failed. Before recording any finding for the test, it is best to have several practice periods in order to be sure that the patient understands the test and that a significant difference actually exists between the two eyes in those instances where similar reactions are not instantaneous.

Next, a pair of —2.50 D. spheres is introduced and the procedure is repeated. The patient should be advised that the print must not only clear, but also that it must remain clear.

In making part II of the test, the prisms are set at zero so that the patient regains single binocular vision. Then a pair of +2.00 D. spheres are introduced and the patient is asked to indicate when the print clears. The test is repeated while timing the response. During a third test the time that is required for the patient to clear the print is recorded. A response of three seconds or less is satisfactory. If a longer period is required, the reaction is too slow and the test is failed.

Next, a pair of —2.50 D. spheres is introduced and the above procedure is repeated. If the print clears, it must remain clear. A report indicating that the print is alternately clear and blurred is not satisfactory. Also, the exposure slot must remain single. In some cases, where the divergence is poor, the exposure slot doubles. To pass the test the print must become clear within three seconds and it must remain clear while single vision is maintained.

These tests have been included because there is considerable clinical evidence that reading difficulties often are either caused by or are associated with, a sluggish focusing of the eyes. Some individuals require as long as two or three minutes to clear the print! It is not difficult to understand the tenseness and nervousness which results when children with such deficiences are called upon to read or study. A great many patients fail or have difficulty in school for just one reason, they cannot sustain effort. Among those whose visual needs are not being met adequately, we generally find not one, but rather a few low findings, since no function seems completely independent.

In connection with this type of patient, the optometrist should be cautioned against the indiscriminate prescribing of convex lenses to increase divergence. As convex lens power is increased, convergence as well as divergence must be re-evaluated, for unless there is enough con-

vergence initially, the additional plus lens itself can induce a convergence difficulty and result in considerable discomfort to the patient. Often it is necessary to postpone the prescribing of lenses until at least some visual training has been prescribed to improve convergence as well as divergence and focusing.

The prognosis is excellent in those cases where convergence is either below normal or focusing is sluggish. Rapid improvement may be expected using recommended visual training procedures with the prism reader.

Because the dynamic testing procedure in a prism reader resembles the patient's habitual reading situation, one may expect the patient to manifest conditions not readily revealed in a phorometer using a static test. Periodic esotropes and exotropes are examples of patients who often can pass static phorometric tests but who when subjected to the pressure of the prism reader test exhibit a deviation of one eye.

Also many of the subjective symptoms such as neck pain, nausea, headaches and tenseness while reading are reported more readily during testing as a result of the prism reader analysis.

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VISUAL PROBLEMS IN READING AND OPTOMETRIC LIMITS*

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Visual problems in reading and optometric limits of assistance is a subject of interest to both optometry and education. That vision is related to reading is apparent in the definition of reading itself. Warren[1] defines reading as "the visual reception and understanding of words or other sensory data." Reading is normally a visual act.

Historically, vision is closely associated with the study of reading difficulty. It was the studies of the perceptual processes in reading by Valentius, Catell, Erdman, and Dodge, and eye movement studies by Javal in the laboratories in Europe shortly after the middle of the 19th century which sparked the interest during the present century in a general investigation as to all the causes of reading difficulty.

Many studies have been made of the relationship of vision to success in reading with great diversity of results. As we stated in an earlier paper:[2]

> "A survey of this literature would lead to confusion if the reader had little background in the field of vision. However, with some understanding of the visual factors involved, gained from a knowledge of the anatomy and physiology of the eye, physiological optics, and the psychology of vision, some order can be made of the seeming chaos. Much of the research has been done by students who did not have sufficient understanding of the visual factors involved and their possible relationship to the reading act. On the other hand, specialists in the field of vision have made reports which did not meet the requirements of precise research, controls not having been established and procedures validated. Neither has a universal definition of reading disability been agreed upon by education, nor have visual defects, ocular defects, and visual efficiency been defined universally by vision specialists."

The degree of relationship between vision and reading found in research studies depends upon the concept of vision. If a very limited appraisal of vision was used, little or no relationship to reading achievement was shown. As more of the total process of vision was appraised, a stronger relationship was disclosed. In general, research in this field has been plagued with scattered efforts which often raise more questions than they answer. Much has been done which has been of little value. A coordination of research efforts is needed.

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There is, however, a vast body of clinical data available in optometric practices bearing testimony to the fact that by correction of a vision factor in a young patient, reading achievement can be facilitated. This paper is a discussion of the optometric limits in programs of care and remediation. Optometrists are concerned with vision and their sphere of service is to provide vision care for children who are poor readers. Education is concerned with teaching the child. Therefore, corrective teaching techniques must be provided by education, not optometry. Following through with the same philosophy, education not optometry should provide the public with reading clinics. As stated in an earlier paper,[2]

". . . a closer cooperation between all specialists working with the school child is necessary. Each specialist, be he teacher, endocrinologist, pediatrician, neurologist, optometrist, psychiatrist, psychologist, speech and hearing therapist, must have an appreciation of the many causes for reading retardation. Harris,[3] in his book, *How to Increase Reading Ability*, lists the following factors as causes in reading difficulties: Intelligence, vision, hearing, illness, muscular-coordination, speech, glandular disturbances, neurological difficulties, lateral dominance, school record, emotional and social problems. This over-all appreciation is necessary for the protection of the child. When a child is severely retarded in reading there are often many factors contributing to make it impossible for him to achieve. The child (and his parents) must not be led to believe that because one detected problem is solved nothing more can be done to aid him. For instance, vision in some cases may be the only cause; in others it may serve as a contributing cause; while in still others it may be an insignificant factor."

Since education has the responsibility of teaching the child, education should provide clinics to coordinate the services of the various professions concerned in remedial programs in order to make such programs as effective as possible. In other words, in caring for these children, a team approach with education heading the team yields optimum results for the child.

Education must be fully informed as to the importance and nature of the vision factor. We must urge educators not to rely on a limited vision screening program to appraise the weight of the vision factor. Children with a reading problem should be referred for a careful and thorough analysis of the functioning of the entire process of vision especially at the reading distance. The findings of the optometrist should be reported to the clinic or school administrators. Then, with an over all view of the various factors affecting the child's achievement, the clinic or school personnel can best decide the logical order of removing the disturbing factors. Visual efficiency is a prerequisite for and in general should precede "remedial reading." A child has just so much energy. If too much is demanded of the child programs of remediation will fail because the child is always working at near fatigue level. A well balanced program, allowing the child opportunities to achieve and relax is needed.

If visual training is required, optometrists will want to learn from the clinic or school psychologist (a) the parents attitude towards the child's problem, (b) ways of handling the child most effectively in the visual training program, and (c) materials used in perceptual training work. In this way a coordinated program can be planned, one phase of remediation reinforcing the other.

On the other hand the clinic will want to know when enough of the disturbing vision factor has been removed so that remedial teaching can be initiated with benefit.

In areas in which the services of a clinic are not available, we feel this same philosophy of action—optometry providing the service for which it is specifically trained and education doing likewise—should serve as a guide. Optometry would do better to initiate and support a community program of having a teacher trained especially to work with non-achieving children. Optometrists and other professions could cooperate with this teacher rather than trying to provide a service for which they were not trained.

As we consider the problem from a developmental point of view—how a child grows, develops, learns to see, and then learns to read by means of seeing—it becomes apparent that the situation is complex.

Let us consider briefly a child's visual development. The developmental organization which takes place during these pre-school years is vast in amount. Vision is in the making, complex in character and profoundly integrated with the total action system of the child—his posture, manual skills and coordination, his intelligence and even his personality makeup. The eyes are under constant necessity to come into an effective relationship with a rapidly changing motor equipment. These changes involve the child's fine and delicate musculature, as well as far-reaching transformations in patterns of posture and locomotion. In an elementary sense, the child during the first year has acquired all the attributes of adult vision. But the development of human vision can not be explained in terms of attributes. It must be pictured as a growing complex of structured functions which change with the advancing morphogenesis of the action system.

At birth that part of the eye with which clearest vision is obtained is not as yet fully developed. It is felt that the stimulus of light is needed to trigger final development. At first, then, in the days shortly after birth, all a child sees is probably large "blobs" of light without meaning. By four to six weeks he is capable of looking directly at another person. His ability to see clearly continues to develop until by

the time he is five years of age his visual acuity is usually almost the normal 20/20 rating on a Snellen type chart.

Also at birth and during the first weeks of his life, a child looks at an object with one eye or the other. Gradually, he begins to and continues to develop ability to look at an object with both eyes at the same time. The act of looking at an object with both eyes requires coordinated activity of twelve extra ocular muscles which control movement. This he gradually develops. The child must also learn to use the ciliary muscles within each eye which enable him to focus as clearly as possible on an object. The use of these muscles must be coordinated with the use of those outside the eyes (controlling eye movements) in order for the child to obtain a clear single impression of the object looked at with each eye separately. Through trial and error and repeated practice he develops this ability gradually. Coordinated use of the eyes should be fairly well established by the time a child is five years of age.

A child at first looks at large objects near to him. Gradually, his visual acuity and his eye movement control and focusing ability improve, allowing him to widen his range of visual interest. As control of his hands develops so that he is able to grasp objects with his hands, the object goes to his mouth. This "mouthing" is interpreted as a form of tactual-spatial exploration which contributes to a child's visual preception of form and materials. In these early experiences he continually adds to his knowledge of things visually through his sense of touch—the way it feels to him. As his auditory ability improves, his sense of hearing also adds to his visual perception of objects and space relationships. He learns identification in space, and realizes that objects have an accustomed place in space. New experiences enable him to develop new visual abilities. He learns to perceive form. He learns to associate objects with kinaesthetic impressions of hardness and softness. He associates objects with sounds and smells. He learns space and size relationships. He develops visual memory. He learns to note likenesses and differences in forms. All of these are basic visual skills needed for reading achievement. Gesell,[3] has said that on the basis of the profound intricacy of the visual complex alone, it is not strange that there is such an amazing range of individual differences in reading performance both before and after the age of six.

When we consider the five steps involved in the perceptual process in reading we realize that they are the same as those involved in the process of vision. These steps are:

1. Attention to the object of regard—directing visual concentration on the object.
2. Seeing the general configuration of the object.
3. Matching the form of the present object with memory traces of forms.
4. Recognition of the present object.
5. Attaching meaning to the object in terms of past experiences.

Kephart[4] states that it is not the strength of the stimulus, nor the quality of the stimulus, but the constancy of the stimulus which is important to learning. From this we may infer that good functioning of the process of vision is important to a child's visual perception; building of concepts; and general learning. Gesell[5] has stated,

"Refractive errors which yield to optical correction are not in themselves likely to cause reading difficulties. The use of cycloplegics in refraction examinations interferes with the testing of visual functions at near distances. But near point is the area where reading anomalies become manifest. Accordingly, it is desirable in suspected cases to apply a battery of far and near point orthoptic tests and visual skills tests. Such tests serve to reveal anomalies of fusion, fixation, and projection; faulty flexibility; maladjustment and spasm of accommodation; and special errors of refraction like hyperopic anisometropia. Inconstant conditions are more handicapping for reading efficiency than are the fixed ones. It is the alternating phorias, the intermittent squints, and the periodic central suppressions which contribute to reading difficulties."

Evidence from research reports points to the relationship between good visual perception and good functioning of the rest of the process of vision. There is also ample evidence that visual perception may be improved through training.

Having worked for the past several years with a school system in a program seeking to find ways of helping more children to success in reading, I am convinced that what is needed for the sake of the child is a close working relationship between optometry and education. It is said that at least 80% of what a child learns he learns through his vision. Optometry is concerned with vision for the job—in this case the job of learning in school.

If children are to be helped to reading achievement more effectively, optometry will have to help education know more about the visual abilities a child needs for reading achievement; ways to screen to see that a child has these abilities before setting him to tasks requiring these abilities for achievement. Optometry will have to help education know more about the visual needs of children; the importance of good posture and good lighting for good seeing; the need for special seat placement for those with certain visual abilities. Optometry will have to help teachers adjust work programs and assignment loads, and the presentation of their lesson material in light of the visual abilities of certain children. Optometry must help teachers learn to

recognize symptoms of visual difficulty displayed by children and how to use this information meaningfully to the advantage of the child.

In all these, optometric limits must be extended to provide needed advisory service and assistance to education. Education, too, must extend its limits. Optometrists need to know as much as possible about how the child functions in the classroom. Those optometrists doing orthoptic and visual training work are well aware of the effect of emotional, health, and fatigue state of the child on the functioning of his vision. The informed teacher's careful observations of the child as he functions on the job day after day is a needed adjunct to a complete case history and a careful analysis of his vision.

SUMMARY

1. It is obvious that since reading is normally a visual act, vision and reading achievement are related.

2. Research efforts have yielded confusing results to a great extent. However, recent research tends to point to the need for good binocular functioning at the reading distance.

3. A vast body of clinical data from the practices of optometrists demonstrates that improvement in visual functioning facilitates reading achievement.

4. There is so much interlacing between vision and reading that a clear-cut line of demarcation can not be established.

5. Each field—optometry and education—must extend its services and then cooperatively work out programs, utilizing its own specialized knowledge. Trying to use techniques and devices beyond specialized training will fail, in either field, to produce results of greatest value to the child. Rather than thinking in terms of limits alone, we must think in terms of cooperation and a coordination of efforts.

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MULTIPLE SPECTACLES—AN ESSENTIAL PRACTICE FACTOR

October, 1958, has been selected as *Complete Visual Service Month*. The need for more than one pair of spectacles will be stressed and the slogan that was introduced at the 1957 Optical Fair, "The Right Eyewear—at the Right Time—Makes a World of Difference" will be emphasized. This special promotion, sponsored by the Optical Manufacturers Association and widely supported throughout optometry, will help direct attention to the need of some patients for duplicate pairs of spectacles and for various types of special purpose corrections. Optometrists should pass these ideas on to those patients who will benefit.

Duplicate spectacles and spectacles for special uses have been recognized as essential factors in the well-being of many patients for years. Much has been written on this subject and some headway has been made in acceptance of these ideas. The fact remains that many moderately high ametropes who are entirely dependent upon their spectacles have only one set. This is true even though most patients

admit that several pairs would make them visually more efficient—better dressed—and less subject to discomfort, if not disablement, in the event of loss or breakage.

Why, then, do so many patients have only one set of spectacles? Should the blame be placed upon optometrists? Are the patients at fault? As a matter of fact, both optometrists and patients share the responsibility; although, in the final analysis optometrists must receive most of the criticism since they prescribe for and advise the patient. Failure in this aspect of practice by the optometrist cannot be rectified by patients who, without professional training, cannot be fully aware of the need and advantages of multiple pairs of spectacles.

Let us first consider the idea of duplicate spectacles or spectacles for special uses from the standpoint of the patient. Nearly all patients freely admit that the idea has merit. When objections are raised these are: (1) lack of immediate funds, (2) no pressing desire for a second pair, (3) would rather have something else right now, (4) failure to understand the need, (5) feels that the materials are too costly to order two sets, (6) tendency to procrastinate and (7) pressure of other things. Several of these excuses obviously overlap, but they are all presented as these typify the casual resistance encountered when the idea is presented to patients.

Most of these excuses are standard ones familiar to everyone with public contacts. They all may be overcome by a professional man and his assistants more easily than by any others. All that is needed is enthusiasm for the idea coupled with an office credit program that permits patients to spread the costs of the entire professional service including examination, refraction, materials and dispensing charges over several payment periods.

Next, let us examine this same problem from the viewpoint of the optometrist. Most practitioners readily admit the multiple pair idea has merit for many patients. Some optometrists do a splendid job in putting the idea across, but many make little or no effort in this direction. This failure on the part of the optometrist constitutes an actual disservice to many patients. The reasons for their failure are: (1) lack of belief in the need for multiple pairs, (2) failure to have a long-term credit or budget plan available for patients, (3) regularly minimizing or ignoring the dispensing aspects of practice, (4) failure to explain to the patient the advantages of multiple pairs of spectacles, (5) failure to explain to the patient the advantages of special purpose corrections, (6) the fear of discussing and proposing substantial expenditures of funds with patients and (7) frequently being too busy to bother with

the idea at all. These, too, are factors that may be corrected readily.

Professional people, to a very great degree, prescribe for their patients and, consequently, salesmanship in its ordinary sense is not a major requirement to make the multiple pair idea acceptable to a large number of patients. Rather the everyday common sense approach, suggestion, and pointing out the need and self interest aspect of the matter to the patient should be used. This, accompanied by an attitude of confidence on the part of the optometrist will make his presentation more acceptable to the patient.

In this connection Morgan* suggests that he attempts to handle the problem with his patients by discussing with them, (1) the nature of their problem, (2) what may be done to help overcome the problem, (3) the penalties and (4) the ease and certainty of satisfaction associated with the solution. Usually, he points out, this gets the patient to thinking and asking questions. It is at this point that they discuss the idea that the solutions need not be alternatives, but the patient might use several. In other words cost is then considered as they would consider it normally.

This is particularly effective when it may be pointed out that credit terms are available if requested. There are several plans that may be used—the most recent was suggested by Olson and Wick.† In addition, if bank financing is preferred most local banks will handle accounts if the total is $75 or more.

The other reasons for failure on the part of an optometrist to implement this idea are largely the result of shortsightedneses and bad practice habits on the part of the practitioner, as every patient who needs several modern corrections and who receives them is a more satisfied patient and one who is most likely to recommend his optometrist to his friends.

Prescriptions for various specific needs are a professional patient requirement and provision for these should be made as a matter of course during the refraction itself. Patients readily understand such matters and appreciate the thoroughness of the optometrist in prescribing for all special focal requirements.

Multiple pairs for patients who will benefit from them should be suggested at all times by optometrists. If this is not already a standard part of an optometrist's practice, now is a fine time to start. In so doing, the optometrist will be providing a better service to this patients and building good will among them.

CAREL C. KOCH

*Personal communication from Meredith W. Morgan, of April 8, 1958.

†Olson, Marshall S., and Ralph E. Wick. Credit control in a professional practice. Am. J. Optom. & Arch. Am. Acad. Optom. 35 (4) 206-220, 1958.

SPECIAL REPORT

THE CHANGING CONCEPT IN OPHTHALMIC STYLING AND DISPENSING*

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and
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During the past ten years the ophthalmic professions have been going through one of the most rapidly moving and drastic transition that any profession has ever experienced. This transition in the field of dispensing has become an important time consuming responsibility for the practitioner. Patients realize that lenses are prescribed to improve their vision, and frames for their beauty and appearance. Because of fashion doctors are no longer prescribing a product their patients do not wish to use. In this report we shall review old styling methods: discuss problems that style has created in a professional practice: study ways of solving time consuming style selection, and explain methods of giving better care to more patients through efficient office arrangements.

Today's ophthalmic professions provide an invaluable service, that of providing proper eye care for patients. For the optometrist, proper eye care involves also providing of proper eye wear for all needs and occasions. We know that proper eye wear involves not only lenses with the correct prescriptions but also a correctly-fitted, attractive appearing frame. These spectacles represent a product which helps determine the well-being of patients, their enjoyment of life, their appearance, and their everyday comfort. These modern spectacles are providing patients with proper eye care for today's modern living. It is small wonder that the ability of the doctor to help provide for the well-being of his patients is usually reflected in his own personal success. His success today depends to a great degree on his satisfying his patients in the styling and servicing area of his practice.

*Read before the annual meeting of the American Academy of Optometry, Chicago, Illinois, December 9, 1957. For publication in the October, 1958, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.
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For many years spectacles have been dispensed in the same old way and by the same old system. The doctor escorted the patient to a small, poorly-designed table at which the patient sat at one side and the doctor on the other. This resulted in a head-on arrangement. The table was equipped with a small peek-in mirror into which the patient could peer. The doctor would then proceed to take individual frames from a drawer or sample case and place these on the patient's face, allowing an interval for the patient to peer into the mirror, first head-on, then attempting to visualize her left profile and then her right. Usually one frame after another would be tried until finally the doctor would persuade the patient that the frame looked fine or until the patient gave up in exasperation.

This styling method was more or less satisfactory when styles were limited to several pairs of rimless mountings and several pairs of frames. Today, however, that method of conducting the important styling function should be gone. The number of models has increased and new ones are being introduced every day, in a host of desirable colors, shapes, temple variations and design detail for added beauty. This brings the variety of styles to literally thousands, and this style era that we are in will be with us for some time to come. In some areas commercial outlets have windows, show cases and pegboards full of frames in view of the passerby on the street. Consequently, all patients are aware of the fact that a broad variety of frames are available and when they come to their doctor's office, they too wish to see variety. This broad selection of frames that most patients insist on seeing points up the fact that the doctor must have a new approach to this phase of practice. The professional man must expose this variety of styles and colors to his patients in a little more systematic and yet not too time-consuming manner. The success of the professional practice is dependent, to some degree, upon keeping pace with modern selling concepts and methods, used so extensively by business, but adapted to the profession and kept on a high ethical level.

Now let us look at some of the equipment which has been devised to assist in the styling function in an endeavor to see if these devices fit the requirements. There is the pegboard display on which a variety of frames may be displayed. These boards certainly help in displaying frames to patients. Unfortunately, however, many of these boards are difficult to maintain and to keep orderly looking. Often the hooks on which the frames are hung are unsightly or actually mar, scratch, or otherwise injure the frame. The patient, as a rule, enjoys very little privacy in an arrangement of this kind while trying on frames and

often must make the selection while standing. Usually the doctor must attend the patient in order to assist in removing and replacing frames. Because of the nature of this device, the doctor often not only must spend time in serving the patient, but also loses control of the patient. Frequently the result of such a pegboard is confusion.

Some of the disadvantages mentioned also apply to other non-functional displays such as style bars. Many doctors have found that these devices have failed to give them a smooth-running, efficient and dignified office. The dignity which the doctor enjoyed in his examining room is lost during the styling transaction. Also many doctors are reluctant or refuse to install a display similar to those displays which are often harshly spotlighted in the outlets of the commercialist. The problem of today's modern professional doctor is: how can I derive the same benefits of display without loss of time, loss of patient control, loss of dignity and yet enjoy maximum efficiency?

Several years ago, a survey was made of eighteen doctors. Fourteen of these indicated that they were either putting up a pegboard, were planning one, inquired as to where one could be installed, or wondered how the frames could be attached. Many questioned what other devices might be available by which to display frames in their office in an ethical and professional manner. The important point was that every one of these doctors recognized the need for displaying frames, and it was evident from their questions that they were not satisfied with the existing home-made devices. It was evident that there was a need for a *functional professional display.*

Sometimes the easiest and quickest way to solve a problem is to look around and see what others are doing in a similar situation. Let us look at how women select the things they wish to purchase. The first thing a woman shopper does is browse. She is relaxed. She prefers to look by herself, unhurried. She leisurely looks, feels, tries and studies the object she is interested in at the time. The same system should be applied here. After all, when she is selecting a frame she is selecting something to wear and she doesn't care to have the doctor or his assistant *outwaiting* her. As we make comparison we are not comparing a professional man or his office with a drug store or with a department store or with a super market, but we are pointing out that the same person who comes to the doctor as a patient also goes to those places, and therefore is exposed to new ideas and methods of selecting.

After taking this analysis of how others offer selections, we applied the same ideas to our problem. In addition, some design factors were established which we felt doctors would insist on before installing this

type of equipment in their offices. We have already suggested what these factors are: the equipment must be functionally correct; it must be impressive and add to the beauty of the office; it must be dignified; it must be compact to save space; it must have maximum display values; it must allow privacy; it must conserve the doctor's time, and it must incorporate the modern concept of self-selection.

Then we asked questions of a number of successful doctors; talked to design stylists and talked to equipment manufacturers. After we had come up with some pieces which were a result of this careful designing, we tested them in doctor's offices and dispensing offices under everyday operating conditions. The result was "The Professional Suite Line of Furniture and Equipment." There are several other companies that also have made real contributions to the designing of dispensing room equipment and have it available—and in most instances, these, too, work out very nicely.

First let us consider the initial piece of equipment that we have designed for the modern styling room of professional doctors. Note that the design of the Select-A-Frame, Figure 1, fulfills the requirements outlined as being necessary. It is more than a means of displaying frames; it is actually an entirely new device embodying the self-selecting concept in modern styling.

Fig. 1

This modern display center has these features: 1. white background panels enhancing the beauty of the frames; 2. formica background panels allowing easy cleaning; 3. specially designed plastic clips or trays holding every style of frame neatly in place; 4. panels holding 60 to 100 frames, all within easy reach of the patient; 5. large, clear mirror affording the patient full view from the waist up; 6. a narrow table top specially designed for the convenience and com-

fort of the patient. This brings her closer to the mirror, giving her a better view and also allows room only for several frames at a time.

This unique styling tool works in practice in several ways. (1) The patient may select her own frames. (2) The doctor may assist his patient in her selection of frames. (3) The doctor may prescribe the style he thinks best for his patient.

With the "Patient Selection" method, the doctor leaves the selection of frames entirely to the patient to a large degree. After seeing to it that she is comfortably seated at the Select-A-Frame table in the styling room, the doctor may say, "Mrs. Smith, in view of the fact that you will be wearing your spectacles all of the time, it is doubly important that the frame (or frames) feel and look well on you and also look well to your friends and to others. Style is important. Experts in this field point out that shape and color are important considerations. These several styles lend themselves to greater individuality if we strive for a combination that either complements or contrasts with your features and coloring. This particular frame is an example of contrast (slip on one in the appropriate size and point out why) this one compliments (again slip a frame on the patient)." One patient may be hazy in her wishes regarding a frame and another may be perfectly clear on what she felt she wanted. In any event, most patients will react well and the expressions will lead to an immediate choice or a clear exploration of the best possibilities for themselves.

After the doctor leaves, the patient is free to make her own selection, at her leisure and in privacy. If she is with her husband or her friend, they are free to assist by discussing styles and colors. Meanwhile, the doctor looks after other patients. He may make several minor adjustments or deliveries or take the history of his next patient. From time to time he looks in on Mrs. Smith to note her progress. During one of these visits he may be called on to assist. Then, when she has selected the syle and color of her frames, he may close the Select-A-Frame to prevent further vacillation and suggests that she accompany him to the fitting table. The patient has had her way for a while, but now he is again in complete charge. It is at this point that he either confirms her selection or suggests she consider a similar style that will assure proper fit. In those rare occasions where he disagrees with her selection, he should give her the reason why her selection will not be suitable. Wherever possible, prescribe the style she has selected because the patient will be most happy if allowed to have the style and color of her choice. In either instance, the doctor is in command of the situation and should exercise his professional opinion.

After the patient has been seated at the fitting table, only a few minutes are required to arrive at proper measurements. So rather than spending precious time with the patient in making the selection, he actually spends only five or 10 minutes completing this service. He saves time and his patient is pleased because she has leisurely selected the frames herself. It should be understood that from the 60 to 100 frames displayed on the Select-A-Frame, thousands of combinations may be developed to meet the needs of the multiple pair concept.

With the "Doctor Selection" method, the doctor prescribes the patient's frames. Here he must project complete authority. However, this plan still employs the "Select-A-Frame" and a complete assortment of frames from which to choose. Here the doctor selects several frames for the patient's consideration, but suggests those that he believes to be just right for all of the patients needs. The doctor will point out reasons why he is prescribing these certain frames. Reasons that are completely understandable to the patient. We realize, of course, that the doctor cannot always handle that group of patients from their teens up into their 40's by this method. They usually prefer to select from a broad variety without too much assistance from the doctor.

The third method is known as the "Doctor-Patient Selection" method. Here, as in the first two methods, a modern self-service device offers the patient a complete assortment of frames from which to choose. The doctor may, if he wishes, assist the patient much as he does in the previous method. He actually chooses a few frames for the patient's consideration, but then instead of "prescribing," he simply stands by until a complete selection has been made. There is nothing new about this method. It is old-fashioned and not in gear with a modern practice. It is more time-consuming and usually prevents the doctor from taking full control of the situation. However, this method is often necessary for the quite young and older patients.

The three methods we have outlined are usually considered—by most doctors—as the three "basics." However, there is one other method which is a variation of the "Doctor-Patient Selection" and the "Prescribing" method. It too is a good method and as in the other plans a Select-A-Frame is used. The doctor places himself between the selection of frames and the patient. With this method the doctor immediately eliminates those frames that do not apply to his patient. For instance, he may say . . . "Now, Mrs. Smith, the first two rows are for teenagers. The next two are primarily used for outdoor spectacles. And this group of frames is used for evening wear. I believe these two rows of frames are most suitable for your general every day require-

ments." The doctor then proceeds to select several frames and determines basic style and color. The doctor has thus modified the method to the point where he lets the patient look, select, and know that his assortment of style is complete to meet the patients every need. Yet, he limits the patient to a much smaller number of frames from which to choose. This system works very well, but again the doctor must project authority to make it work properly.

Through these methods of operation we have shown how working with this modern dispensing equipment fulfills the requirements which satisfy the growing demand of the patient for fashion, style and multiple pair service. In the interest of more successful operation, the doctor can also increase his own efficiency, see more patients each day, and the use of a display will reduce the number of frame styles necessary to have on hand.

Now the question is, which method should one use? A partial answer may lie in the physical arrangement and the available space of an office. Let's first analyze the modern professional practice. It involves at least three distinct but interrelated functions. These three basic functions are: (1) Examining, which includes refracting and prescribing. (2) The personalized styling and selecting of frames. (3) The dispensing, fitting, upkeep, service and adjusting. There may be a difference of opinion in the minds of the doctor and patients, as to which is the most important. To many patients the two areas of the practice, where styling and servicing is rendered, is vitally important because they spend so much more time there than in the examination room. Actually, the doctor sees more people every day in the 2nd and 3rd areas of his practice than he does in the first area, his examining room. If there are three basic functions or services, there should be three basic departments in a doctor's office, each separate from the others. If the doctor is to perform the best service for his patients, he should have: (1) An Examination room; (2) A Style or selection room, and (3) A Dispensing room. Each room should be equipped and furnished for its particular needs.

There are very complete and expensive instruments and equipment in the examining room, beautifully designed, engineered for efficiency and precision and available in attractive colors, with thousands of dollars invested; yet this is only one area of the practice. The other two areas have been sadly neglected. Very little thought has been given to function, efficiency and design, nor are they planned for the purpose of serving intelligent people better and as was mentioned, more patients are served here than in the examining room. Yet the doctor can equip

both a style room and a dispensing room for an investment equal only to 10 to 20 per cent of his examining room.

Some doctors do have a problem in that they do not have the space to have three separate departments. However, a study of the available space may help. Remembering that office space costs so much per square foot, therefore, the space should be so arranged to be as productive as possible, arranged in such a way that the doctor can best serve his patients. It is not uncommon to find a little powder room, a private office or an edging department. Usually, none of these rooms actually help the doctor to be more efficient, or help him so he can serve more people or serve them better. He does not serve patients in these departments. Usually, these rooms actually slow him down so he sees fewer paying patients.

There are many experiences where doctors have thrown out edging departments, private offices, and powder rooms, converted the space to style rooms and dispensing rooms, and found themselves seeing more patients every day. After all, there are only two ways to increase one's income in a practice. (1) Increase fees. (2) See more patients. A doctor will add approximately two productive hours to each day without putting in more time, if his office is arranged and equipped so that he can serve more than one patient at a time.

In view of these considerations, today's optometrist must consider complementing a well-equipped examining room with furniture and equipment to best enable him to carry on the important dispensing functions. if he is to perform the best possible service it is imperative that his office include three basic and separate departments—an examination room, a style room, Figure 1, and a dispensing room, Figure 2, showing the Profession Suite fitting table. Here the doctor and patient

Fig. 2

are not directly opposite each other. This table has been designed for the convenience of both doctor and patient. The modern contour of the table adds style—but at the same time is functionally designed to enable the doctor to be close to the patient without headon contact. Also here the patient is shown facing the large, slanted mirror, affording the patient a full view of herself. Behind the mirror there is a handy storage area for Rx pads, envelopes, pliers, etc. There is also a receptacle for soiled tissues, eliminating even the necessity of a wastebasket. The comfortable, patient's chair has been designed to hold the patient up to the table, thus eliminating difficult reaching-over by the doctor.

CONCLUSION

Today's optometrist must not underestimate the value of the service which he renders—that is, the privilege of providing proper eye care for today's American consumer. In his over-all operation, the styling and fitting functions must receive increasing attention because of the importance of fashion and comfort in the minds of his patients—and because of the obvious benefits to be realized in potential income and enhanced reputation for the doctor. The methods which the doctor uses must be in gear with today's modern marketing, yet at a professional and ethical level; he must keep pace with the growing competition for the American dollar. If he is to repel the invasion of the commercialists upon the ethical ophthalmic profession, and if he is to satisfy his patient to the extent that there is no room for those outside of the ophthalmic field to enter it, he must *use* modern methods of displaying, selecting and servicing of fashionable eye wear.

ERRATA

In the original paper by Cdr. Paul R. Kent, MSC, USN, "Convergence-Accommodation," August, 1958, issue, the equation under Table I, page 401, should read:

$$CA/C = \frac{\text{Convergence Accommodation (diopters)}}{\text{Convergence (prism diopters)}}$$

Also in Figure 2 of the same paper, page 398, we find the illustration would be more meaningful if the cut-line had indicated that the solid line represented stimulation and the doted line—relaxation.

TRANSACTIONS OF THE AMERICAN ACADEMY OF OPTOMETRY

A department devoted to announcements, reports, appointments, organization data, news, professional problems and ideals, as these relate to the Academy.

ANNOUNCEMENT OF PROGRAM FOR AMERICAN ACADEMY OF OPTOMETRY

December 13-16, 1958, Statler-Hilton Hotel, Boston

The annual program of the American Academy of Optometry which will be held next December in Boston is nearly complete. Over 40 original papers dealing with all aspects of optometric practice and research will be presented. The papers which have been scheduled are as follows:

The binocular induced phi movement as a method of measuring binocular fixation disparity, Albert V. Alder, O.D., Dayton.

The optometric use of the Schioetz tonometer, John H. Carter, O.D., Division of Optometry, Indiana University, Bloomington.

Problems and compromises in the design of aspheric cataract lenses, John K. Davis, American Optical Company, Southbridge, Massachusetts.

Empirical aniseikonic corrections for pre-school anisometropes, Robert J. Davis, O.D., Henderson, Kentucky.

Further studies on relationship between amblyopia and the Stiles-Crawford effect, Jay M. Enoch, O.D., Ph.D., Department of Ophthalmology, Washington University, St. Louis.

Development of the Army's Occupational Vision Program, Robert C. Eschbach, Captain, MSC Chief, Occupational Vision Branch, U.S. Army Environmental Health Laboratory, Army Chemical Center, Maryland.

Age and the accommodative convergence relationship, Glenn A. Fry, O.D., Ph.D., School of Optometry, The Ohio State University, Columbus.

Subjective sensitivity to brightness and brightness difference, Sylvester K. Guth, B.S., D.O.S., Radiant Energy Effects Laboratory, General Electric Company, Cleveland, and A. A. Eastman, B.S., Radiant Energy Effects Laboratory, General Electric Company, Cleveland.

A history of the posterior accessory optic tract, Ducco Hamasaki, O.D., School of Optometry, University of California, Berkeley.

Influence of illumination level on near-point tests, Frederick W. Hebbard, O.D., Ph.D., School of Optometry, The Ohio State University, Columbus.

Relationship between design of refracting rooms and refractive findings, Frederick W. Hebbard, O.D., Ph.D., School of Optometry, The Ohio State University, Columbus.

Recognition of colored signals by normal color defective observers, Gordon G. Heath, O.D., Division of Optometry, Indiana University, Bloomington.

Stereopsis and industrial accidents, George C. Hill, O.D., industrial optometrist, Norfolk Naval Shipyard, Portsmouth, Virginia.

Accommodative fatigue in the aging radar observer, Jerome A. Hirsch, O.D., Dayton.

Relationship between age and astigmatism, Monroe J. Hirsch, O.D., Ph.D., Ojai, California.

A keratoscopic survey of 13,395 eyes, Henry W. Hofstetter, O.D., Ph.D., Division of Optometry, University of Indiana, Bloomington.

Hearing and optometry, Kenneth O. Johnson, Ph.D., American Speech and Hearing Association, Washington, D.C.

Refractive techniques for the decreased vision problems of the aged, Harry Kaplan, O.D., Philadelphia.

An investigation into the clinical value of the duochrome test, John G. Lyons, F.B.O.A., F.N.A.O.D. Opt. F.S.M.C. (Eng.) Chigwell, Essex, England.

The relationship between angle lambda and the residual astigmatism of the eye, L. R. Loper, Captain, 3510th USAF Hospital, Randolph Air Force Base, Texas.

Visual recovery from high intensity flashes of light, Robert D. Metcalf, O.D., Dayton.

Haptic (scleral) contact lenses: Their place in the contact lens field, Harold I. Moss, O.D., Wilmington.

Personality, delinquency, and scholarship factors in the etiology of ametropia, Melvin Nadell, O.D., Ph.D., Los Angeles College of Optometry, Los Angeles.

The Orinda vision study (five year inter-professional study of vision screening of elementary school children), Henry B. Peters, M.A., O.D., School of Optometry, University of California, Berkeley.

Final results of project in collaboration with the American Printing House for the Blind, Jack H. Prince, F.B.O.A., F.S.M.C., F.R.M.S. (Eng.) Department of Ophthalmology, Ohio State University, Columbus

The Goldman perimeter: Methology and results, Ira Schwartz, O.D., Groton, Connecticut.

Further studies on blurring and color discrimination, Arthur Shlaifer, O.D., Ph.D., Pennsylvania State College of Optometry, Philadelphia.

Some aspects of lens optics, Frederick Wm. Sinn, O.D., Pennsylvania State College of Optometry, Philadelphia.

The functional readiness questionnaire: Statistical correlation of specific visual deficiencies and each question based on 100 to 150 cases, Harold A. Solan, O.D., New York City.

A study relative to the effectiveness of the A.O.A. patient referral forms, William G. Walton, Jr., O.D., Narberth, Pennsylvania.

Vision in aviation, Thomas D. Whiteside, RAF Institute of Aviation Medicine, RAF Farnborough, Hants, London, England.

Comparison of corneal curvatures and corneal astigmatism between twins and siblings—A study of heredity and environment, R. J. Wixson, O.D., Shomokin, Pennsylvania.

Interrelations of vision measurements, Francis A. Young, Ph.D., Department of Psychology, State College of Washington, Seattle.

In addition to the regular program of the Academy the following Contact Lens Symposium has been arranged Sunday afternoon, December 14.

History, optics, and use, Bernard Mazow, O.D., Houston.

Terminology, characteristics of lenses currently in use, Robert C. Graham, O.D., Pasadena.

Physiology of cornea as applied to contact lens fitting, Isidore Finkelstein, O.D., Ph.D., New York City.

Technique of fitting, Jack Neill, O.D., Philadelphia.

Ordering lenses from laboratory, necessary data, inspection of lenses received from laboratory, care of lenses by patient, William W. Policoff, O.D., Wilkins-Barre, Pennsylvania.

Economics, Irving P. Filderman, O.D., Memphis.

Upon the completion of the symposium time will be allowed for the audience to discuss these subjects with the panel.

In addition to the original papers and the Sunday symposium, five outstanding programs have been arranged for each of the Sections under the direction of Donald Springer, O.D., of Anniston, Alabama. The Section Chairmen are as follows:

Oscar McCulloch, O.D., Holyoke, Massachusetts—Aniseikonia and Refractive Problems.

Bernard Mazow, O.D., Houston—Contact Lens and Sub-Normal Vision.
Herman Sager, O.D., Lake Success, New York—Occupational Optometry.
John Zettel, O.D., Cincinnati—Orthoptics.
Monroe Hirsch, O.D., Ph.D., Ojai, California—Pathology.

The Section meetings take place each morning (Sunday through Tuesday) from nine to eleven. They are informal in nature and detailed discussions are arranged on matters of clinical importance. Further announcements of the Section Programs will be made at a later date.

On Sunday afternoon members of the Massachusetts State Society will attend the Contact Lens Symposium as guests of the Academy. This will be one of the regular educational programs of the Massachusetts State Society under the direction of Dr. Louis Anapolle of Boston.

At the formal Round-Table Dinner of the Academy, 7:15 p.m. on Monday, December 15, Hoyt S. Purvis, O.D., Jonesboro, Arkansas, president of the American Optometric Association, will present the Mid-Year Report of the A.O.A. to the Profession, and Thomas H. Eames, O.D., Ed.M., M.D., of the Department of Education, Boston University, will speak on the Relationship of Vision to Learning. The banquet will be preceded by the usual cocktail hour.

Prior to the regular meeting of the Academy a post-graduate period of three days duration has been arranged. Registration is under the direction of Dr. Dan Hummel, 1318 National City Bank Building, Cleveland, Ohio. Over fifty courses will be presented by outstanding practitioners and educators in the field of Optometry. Any optometrist is eligible to enroll in as many of these courses as desired. Information may be obtained by writing directly to Dr. Hummel.

Members of the American Optometric Association and the Massachusetts State Society who attend these courses may make arrangements to attend the entire annual program of the Academy. Sponsorship may be arranged through any Academy member and by registering on Saturday, December 13.

RALPH E. WICK, O.D.
PROGRAM CHAIRMAN

CURRENT COMMENTS

Terry Judith Parkins
Editorial Assistant

Optometrists will confer a favor by sending news items of general interest for this department; such as relate to new instruments, clinical techniques, education, visual health and optometric legislation and organization.

YOUR PATIENTS AND MULTIPLE SPECTACLES

October is Complete Visual Service Month. From coast to coast attention will be focused on the need for multiple spectacles. The Optical Manufacturers Association and the Better Vision Institute will stress the patient's need for more than one pair of spectacles. Optometrists, ophthalmologists and dispensing opticians are expected to actively cooperate and laboratories will support the promotion at local levels. The need for multiple corrections will be presented to the public through the mass media and optometrists are naturally expected to point up the value of the idea at the patient level.

Optometrists may develop this subject in one of four ways. First, naturally, is that of the patient's need for various focal ranges requiring special purpose spectacles. The next is the multiple pair idea designed to secure the patient in the event of loss or breakage. The third brings in the important aspect of appearance or style and the last is the need for a special outdoor or hobby safety correction.

Not all patients need special purpose spectacles, but when needed optometrists should prescribe them as a matter of course. Naturally if a patient requires special corrections to live and work properly these must be suggested. In these cases, the optometrist may point out that without their use, he may not be responsible for the patient's visual efficiency or comfort.

The multiple pair idea to cover emergencies requires a different approach. Here, the degree of dependence upon spectacles is the determining factor. Those patients whose visual acuity is low without a correction or those who become uncomfortable without them will readily understand their reliance upon these aids to vision and will consider ordering an extra pair just to be on the safe side. Certainly patients who travel should have reserve pairs of spectacles for emergency use.

The third approach is made solely on the basis of style. Here the appearance of the patient is paramount. The appropriateness of his or her spectacles for various times of the day and special social functions should be studied. Again the social background of the patient must be

considered. Younger matrons in the country club set will want and need, at least three or four up to the minute hi-fashioned colored frames for use with different dresses, gowns and accessories. And what is more, they will be pleased to learn that in six months you will have an entirely new selection of frames and that you will probably be able to insert their lenses into these new frames to enable them to be wearing the latest and most attractive spectacles at all times. On a slightly reduced scale this idea will appeal to most women and girls.

Older women patients also will appreciate the optometrist's thoughtfulness and interest in their appearance. Here tastes will be a little more conservative, but not too much so—most of these patients will be wearing bifocals, but if they are not entirely dependent upon their distance corrections, you will find many of them attending functions, luncheons, meetings and special events with their spectacles in their hand bags. These presbyopic patients would probably enjoy having one of the new small size lorgnettes as one of their up to date multiple pairs.

This idea of style in spectacles is not confined to women alone. Men also have ideas on this subject and if given half a chance, will order something conservative for the office, a heavy masculine frame and absorption lenses for golf, driving and sports, and a rimless dress pair for evening. Some presbyopic men who have little need for a distance correction are now turning to monocles for use with their dress clothes. These hang around the neck on a thin silk cord and are tucked into the cumberbund or vest when not in use. A monocle of this sort eliminates the need for packing around a pair of spectacles for what little reading is done at and after the dinner hour on social occasions. Spectacles are too bulky for dress clothes pockets.

Don't forget the children—girls particularly—on this question of style. With the cute frames made today, many fond mothers will order an extra set for their darlings if the suggestion is made—and also don't forget that all children's corrections should have safety lenses.

That note brings up the fourth approach. Today almost everyone drives an automobile and should have driving spectacles with absorption lenses. Not only will these help with the day-time driving, but they are are also fine for sports and boating. In addition, the man of the house needs safety spectacles for use in his basement hobby work room.

The possibilities presented by this multiple pair idea are tremendous and the field is wide open for proper cultivation by optometrists everywhere. If done ethically and properly, patients will appreciate the comfort they receive from this extra attention to their needs.

This condition is understood to be the existence of myopia in one eye and hyperopia in the other. In most cases, fusion is lacking and suppression occurs. A correction is necessary which will tend to equalize the image sizes, will look good cosmetically to the friends of the patient, and will correct the acuity at far and near without creating new fusional problems.

A spectacle lens may tend to equalize the image sizes, but will not look good cosmetically. The minus in front of one eye will make that eye look smaller than the eye which is enlarged by the plus correcting lens. Friends of the patient may make remarks about this peculiar effect. But even if this aspect is ignored, and the acuity corrected by means of the proper powered spectacle lenses, the fusion problem which is created is often worse than the original one which existed. Every time the patient looks below the optical center of the spectacle lenses, the eye with the minus correction will have a base down prismatic effect while the eye with the plus correction will have a base up prismatic effect. This vertical prismatic effect is generally intolerable, and if diplopia does not occur, suppression usually must.

Until the advent of modern day contact lenses, this problem of antimetropia was one to be avoided. Today the answer is at hand. The contact lens will tend to equalize the image sizes; will not be visible at all under ordinary conditions and therefore will look well cosmetically; and will move with the eye thereby maintaining the optical center of the lenses in the same relative position to the visual axis regardless of the direction of gaze, thereby eliminating the possibility of a variable prismatic effect.

Antimetropia

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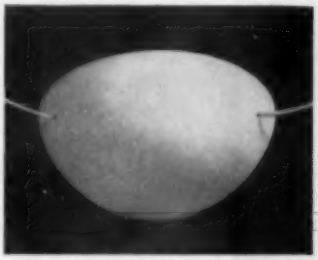

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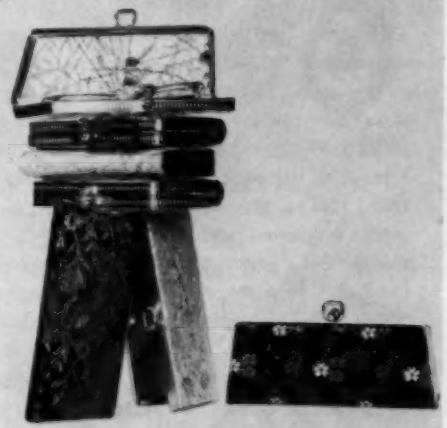

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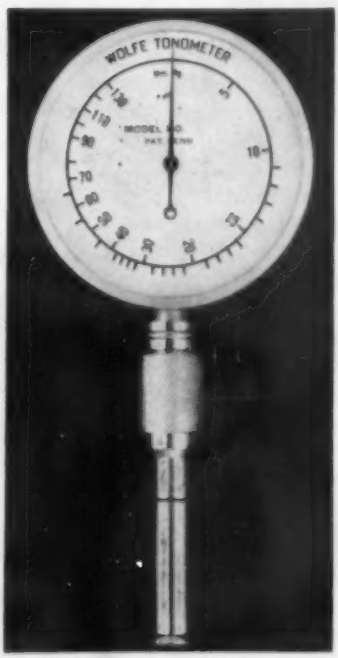

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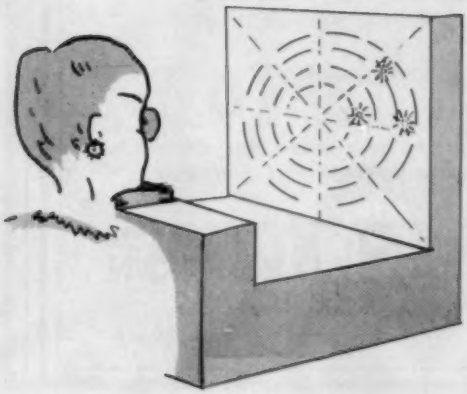

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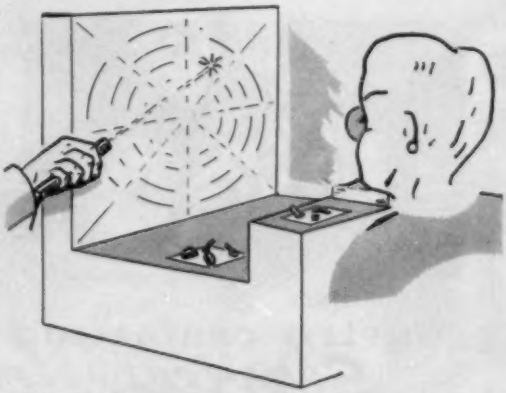

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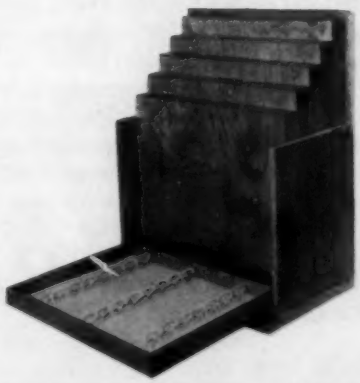

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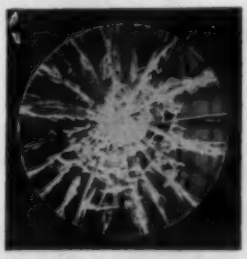

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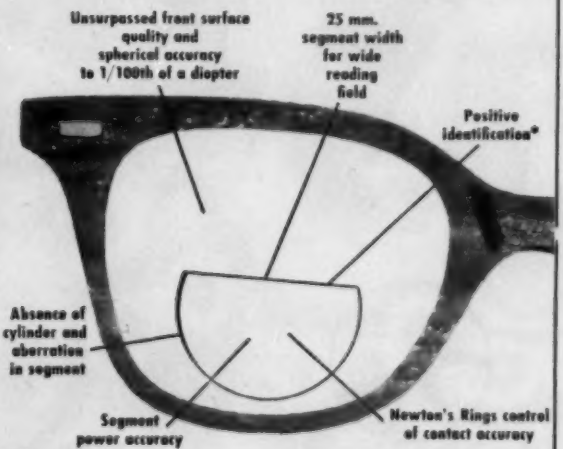
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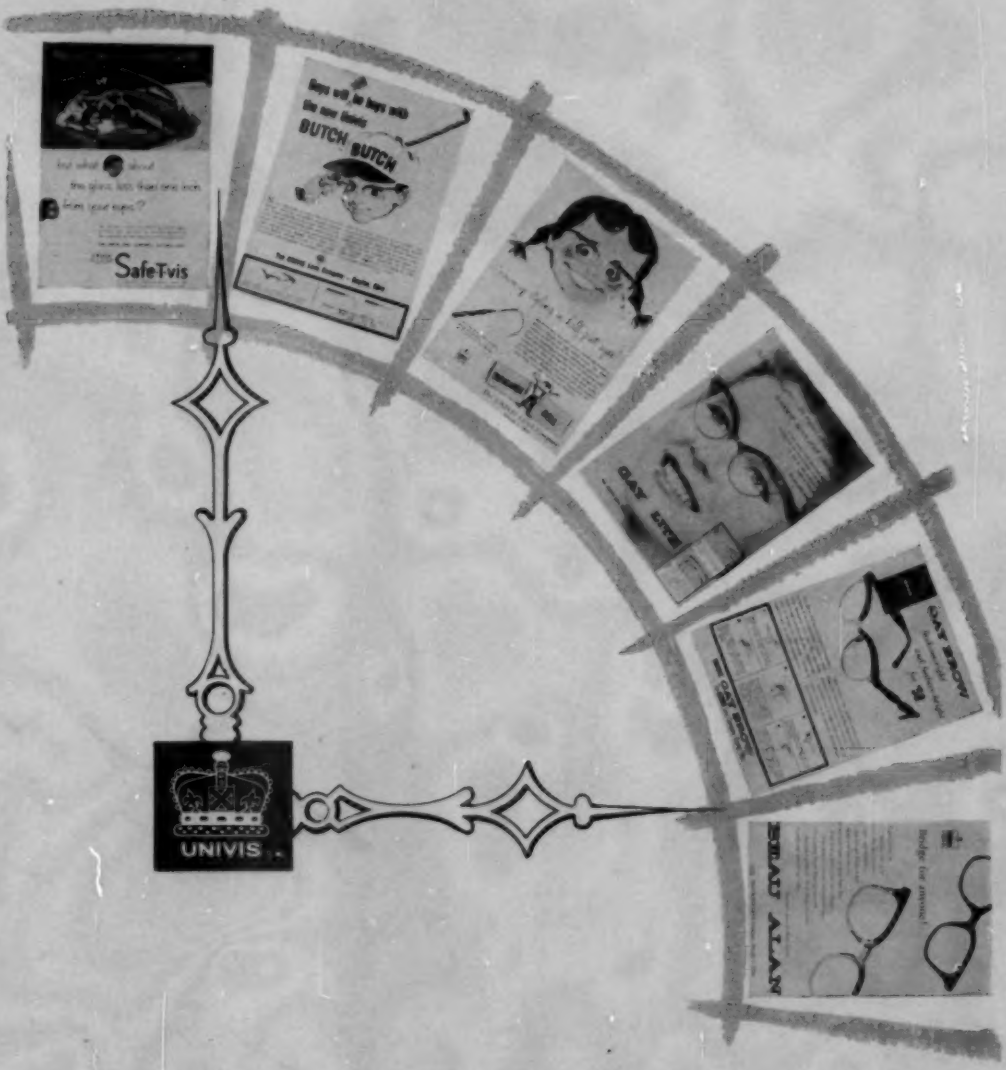

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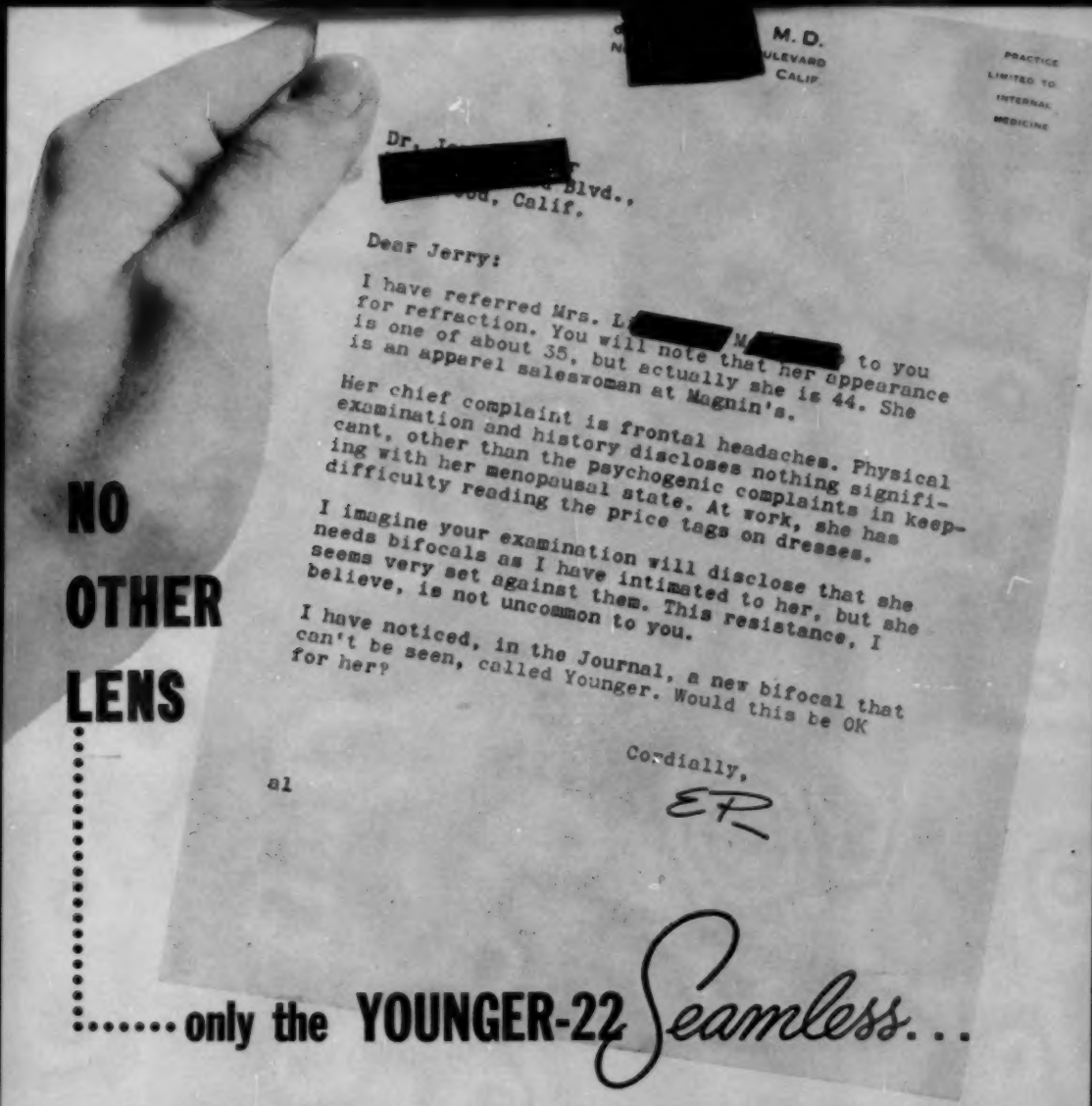
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